May 26, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 53

Salem Builds

CIRCULAR SOAKING PITS
ROTARY HEARTH FURNACES
CONTINUOUS BUTT-WELD FURNACES
CAR BOTTOM FURNACES
FORGE FURNACES
HEAT TREATING FURNACES
NEEDLE METALLIC RECUPERATORS
AIR RECIRCULATING FURNACES
GAS ATMOSPHERE FURNACES
MECHANICAL EQUIPMENT FOR CHARGING AND DISCHARGING MATERIAL FROM FURNACES

SALEM ENGINEERING CO. ★ SALEM, OHIO

SOUTHWEST OFFICE • FORT WORTH, TEXAS
SALEM ENGINEERING CO., LTD. • SHEFFIELD, ENGLAND
SALEM ENGINEERING (CANADA) LTD. • TORONTO

ALL OFFICES STAFFED FOR . . . ENGINEERING, CONSTRUCTION and OPERATION

announcing a basically new idea in resistance welding . . . . .

SYNCHRO-TROL Packaged Controls

You'll profit many ways from this newest Westinghouse first in resistance welding . . . Synchro-Trol controls that come to you as a factory-tested, factory-assembled, compact, packaged unit.

It simplifies your operation because it brings all controls together in one cabinet. You get swift, easy settings and tamperproof protection. It simplifies installation, for it eliminates multiple connections, awkward sizes and complicated mountings. You can save up to 50% in floor space. And it simplifies buying, since you select only the units you need.

You can choose from eight basic subunits and five auxiliary subunits to build up your Synchro-Trol (see panel), plus a blank panel to house any small controls required for your special process. Get the facts today from your nearest Westinghouse office on the ways Synchro-Trol can bring new flexibility to your resistance welding operations. Or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y. J-21418

Illustration shows one type of arrangement for resistance welding. Panels can be substituted quickly and easily to employ other functions.

HERE'S HOW YOU CAN BUILD UP YOUR SYNCHRO-TROL

You take the basic units of Electronic Contactor and Heat Control . . .

add one of the following*

- Weld Timer
- Pulsation Weld Timer
- Electronic Seam Timer

and one of these*

- 7B Sequence
- 9B Sequence
- Blank Panel

and one of these (if you want it)

- Blank Panel
- Voltage Regulator
- Current Regulator
- Forge Timer

*or you can use an electro-mechanical seam timer or temper sequence.

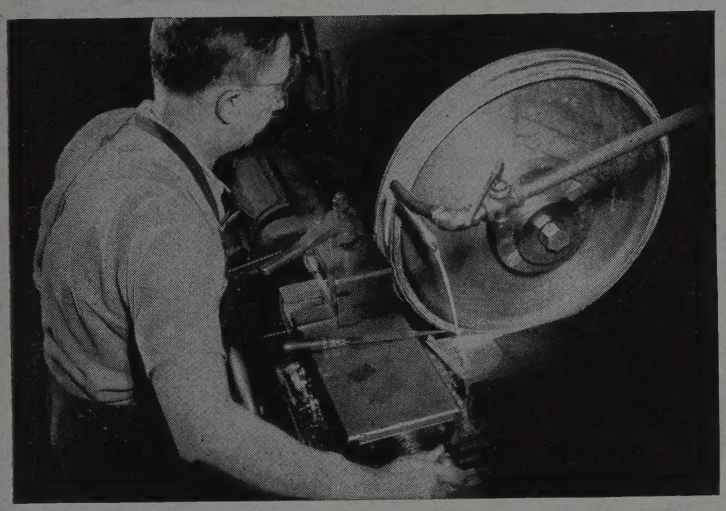
Get the full story in this new book that tells you how to form combinations of the subunits and gain the special advantages they offer. Ask for booklet B-3839.

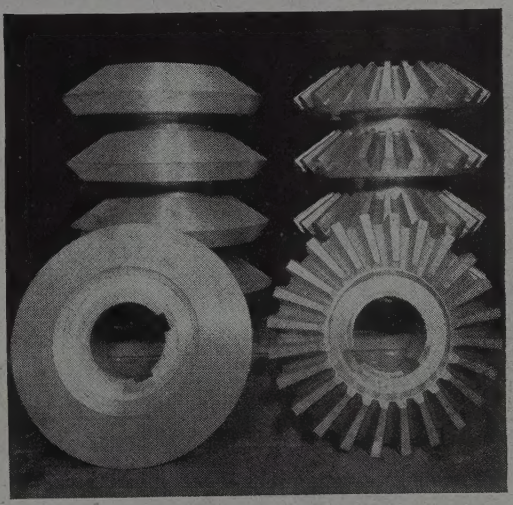
Westinghouse

Synchro-Trol

Electronics at Work

STRENGTH HIGH... WEIGHT LOW





Would you welcome an idea that would save weight and still meet all requirements for strength?

Consider the solid advantages of Bethlehem's circular steel forgings. Topping the list is the high strength created by our unique rolling-and-forging process. Because of this extra strength, thinner sections are often made possible . . . hence savings in weight.

But that's not the only advantage. There are others . . . uniform metal density, homogeneity, fine surface qualities. And we ship these forgings rough-machined, thereby reducing operations for the customer.

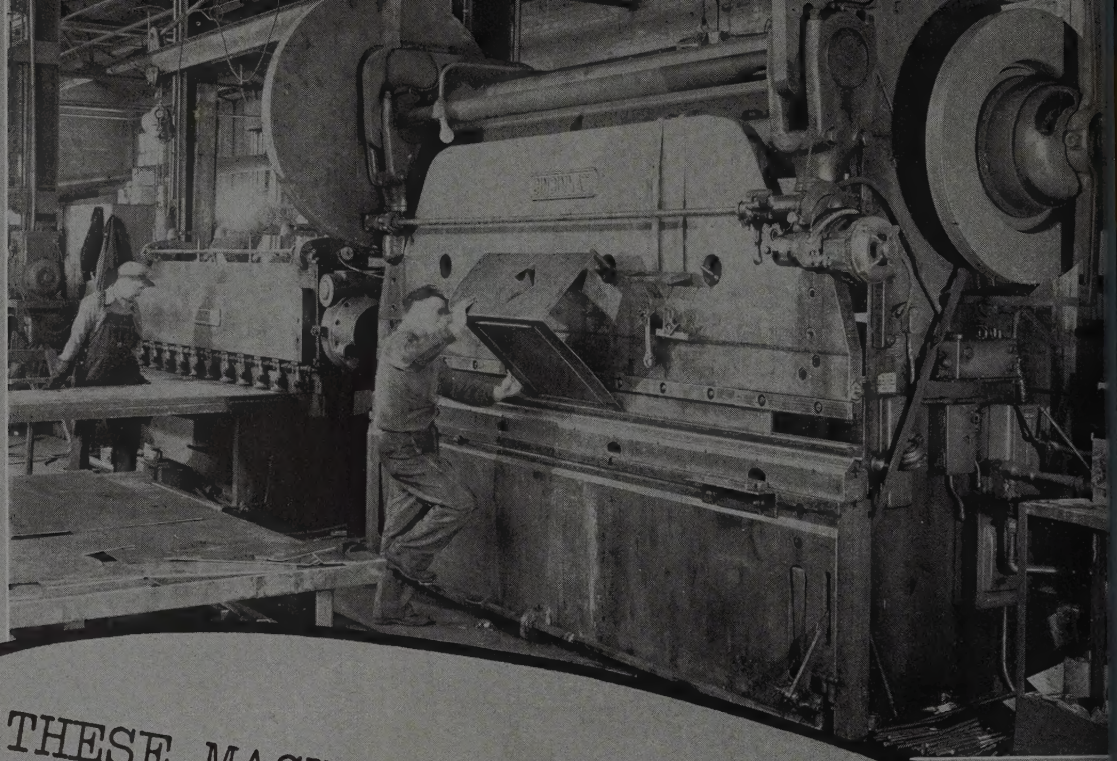
Specify Bethlehem rolled-and-forged circular products for gear blanks, crane wheels, sheave wheels, tire molds, turbine rotors, and similar applications. These products can be furnished in carbon or alloy steel, heat-treated or untreated, and in sizes from approximately 10 in. to 44 in. OD.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

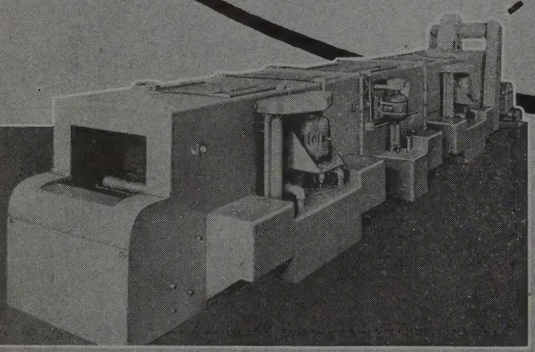
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM ROLLED-and-FORGED CIRCULAR PRODUCTS



"THESE MACHINES HAVE LITERALLY REVOLUTIONIZED OUR MANUFACTURING PROCESSES."



All shearing and metal forming for our Packless Pumps are performed on Cincinnati Shears and Press Brakes. These machines have literally revolutionized our manufacturing processes, in forming, finishing and streamlining our equipment. The work requires accurate performance in both shearing and forming.

—N. Ransohoff, Inc.

● All shearing and forming on this Conveyor Type Wash, Rinse, Phosphate Coat and Dry Machine were done exclusively by Cincinnati Shears and Press Brakes.

Write for Cat. B2, and consult our engineering department on your special metal forming and shearing problems.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

Four-sided foresight

Extra values through

JACK & HEINTZ

Mass Precision

The rubber "shock absorbers" that support Jack & Heintz motors are *square.* There is no danger of the motor frame rotating in service.

This four-sided design puts Jack & Heintz fractional horsepower motor frames in their intended position, and keeps them there permanently . . . for years of *quiet, dependable operation.*

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

Explicit Essay

One of the shortest and most apropos essays we have seen for many a long day comes to us via a short item in the "Executives' Digest", a 4-page letter sent to us upon occasion by Walker & Downing advertising agency of Pittsburgh. Seems that a newspaper was running an essay contest on the subject of "What I Want in My Postwar House", and this skillful author, unnamed but undoubtedly a serious thinker, sent in one short, well-chosen word, "Me".

To The Fountainhead

From that same issue comes a little tale which we thought was interesting, so we'll pass it along. In Princeton, N. J., recently a mother was worried because her daughter had been coming home extremely late from school for several days. Questioned about it, the small lass replied, "I was having trouble with my arithmetic, and people told me that at number 112 lived a man who knew more about arithmetic than anybody else, so I went and asked him if he would help me. He was very willing and explained everything very well." When the mother went to Einstein to explain her daughter's boldness, and offer apologies, she was told, "You don't have to worry. I certainly learned more from the child than she has from me!" All of which seems to point out the truth in the old statement that greatness is merely a well adapted form of simplicity.

Something New in V. P.'s

The vice-president has been the butt of so many jokes and jibes as a result of his alleged lack of duties and because there are so many of him that it's not often you run across any new developments in the vice-president market. The other day, however, we learned that one of America's largest insurance firms comes completely equipped with two vice presidents, a financial vice-president and seven (count 'em, seven) Second Vice Presidents! That really must be a photo finish. You'd think at least one of the seven would have slipped and come in as a Third Vice-President, but none have.

Puzzle Corner

I dunno. Maybe it's the silly season, or perhaps the spring weather is keeping the boys busy with lawnmower and spade, but we haven't yet had a right answer to either the dinner party problem or the pan problem. Even Reid Jones has failed us on that last one. We'll give the answer we had, which was that triangular pieces should be cut from each corner and the sheet then folded so it resembles a truncated pyramid. The formula for maximum volume of the "biggest pan" then becomes $V = 0.0865\ a^3$ where a is the length of one side of the square sheet we started with. Each side would have a developed height of 0.235a and being bent 32° 45′ to the vertical. Dimensions of the pan would be 0.53a at the bottom and 0.785a at the top. If anyone wants to argue, write to R. D. Colinet, 421 Memphis St., Philadelphia 25, on account of he sent it in and can supply you with a 2-page proof of the method used and the calculations. This week we'll get back on a little easier ground with another box problem. It was said that the King offered some fresh Beluga caviar as a prize for the most satisfactory answer to a coconut problem. (We didn't know about this in time, or we would have won. We know all answers to coconut problems.) His chief Puzzle Boy won, presenting the answer on a piece of stiff parchment 30 ginks long by 14 ginks wide. A gink looks something like an inch but isn't, just to be a little more confusing. The King was so pleased he told his boy he could have all the caviar he could take home in a box to be made by cutting a square from each corner of the parchment and folding up the sides (level measurement, beware). Now the Puzzle Boy loved his caviar, so he quickly figgered out a way to get him the most of them fish eggs. What did the sides of the squares he cut out measure in ginks and how many firkins of caviar did he have to go with his martinis that night? To the uninitiated, we will point out 96 cubic ginks of caviar weigh a firkin. Well, so long. Off we go to join the puzzle boy in a few cubic ginks of martini!

From Girls, Too

We've been honored by one of our girl friends, Constance Parche of the Carborundum Co. who addresses us as Dr. Shrdlu. Been going around here looking down the nose at ordinary folk ever since. Now if we could just get a measure of respect out of that gal in Grand Rapids who signs herself K-K-K-Katy, all would be lovely. She sends us nasty problems which always turn out to have trick answers—the hair-tearing kind!

Shrdlu

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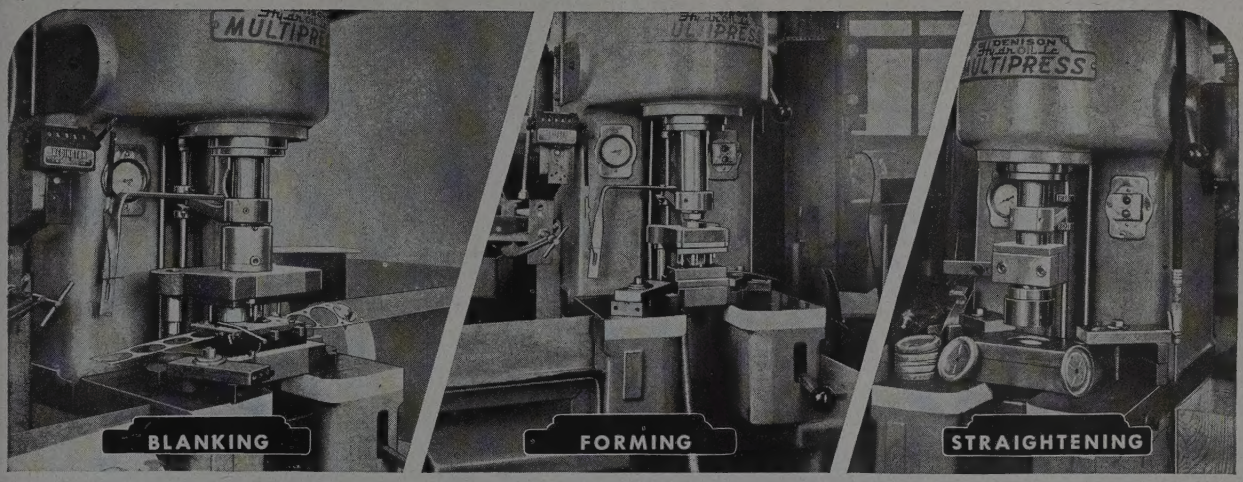
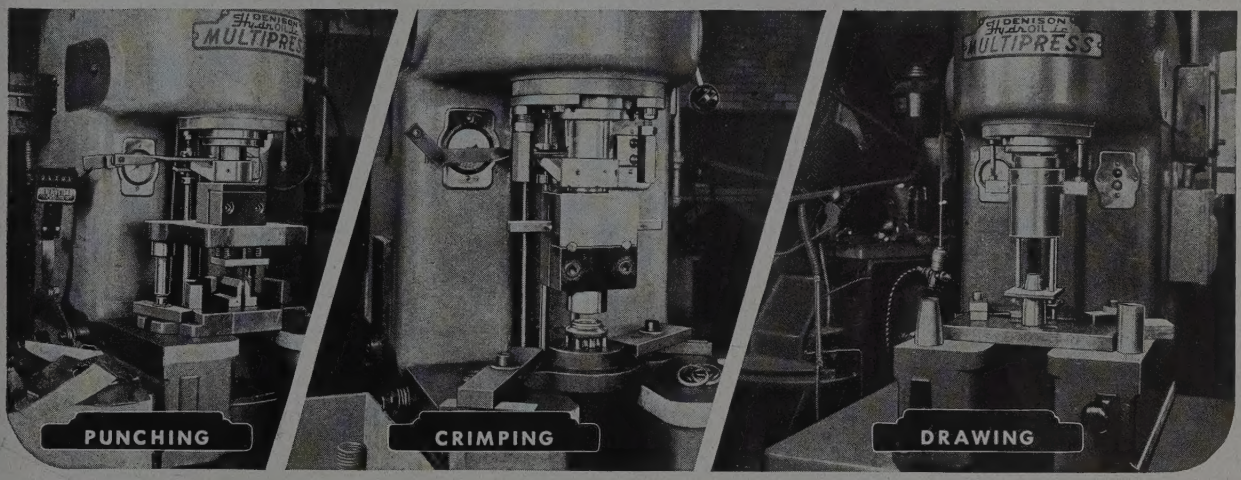
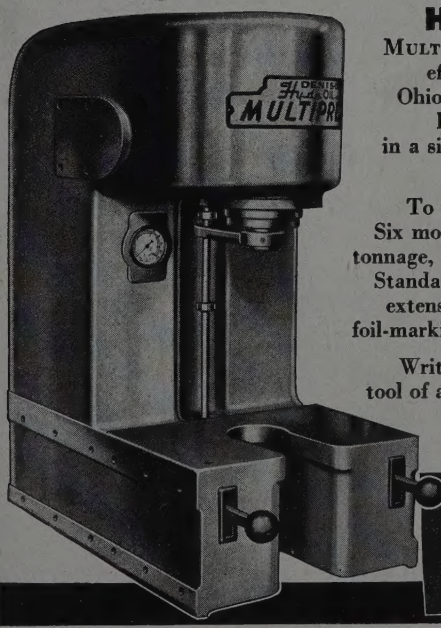
Editorial Staff on Contents Page





It's all in a day's work for MULTIPRESS



Here's proof, right from the production line, of the quick ease with which MULTIPRESS can be retooled for one high-speed job after another. With these six efficient tooling set-ups, The Buckeye Stamping Company, of Columbus, Ohio, adapts their MULTIPRESS units to changing production needs with minimum loss of operating time. All six operations could be handled on one MULTIPRESS in a single day! Using a special die adapter on the Multipress ram, die change time can be reduced to as little as five minutes.

To this simplified tooling, MULTIPRESS adds unusual operating flexibility. Six models, in 4, 6 and 8-ton capacities, offer a choice of manual and automatic tonnage, speed and cycling controls for almost any type of "pressure" job. Standard MULTIPRESS accessories include benches, side shelves, work-table extensions, a variety of bolster plates, and accessory tooling for indexing, pelleting, foil-marking and many other special operations.

Write for full details on this cost-cutting, production-boosting, bench-size tool of amazingly compact and efficient design.

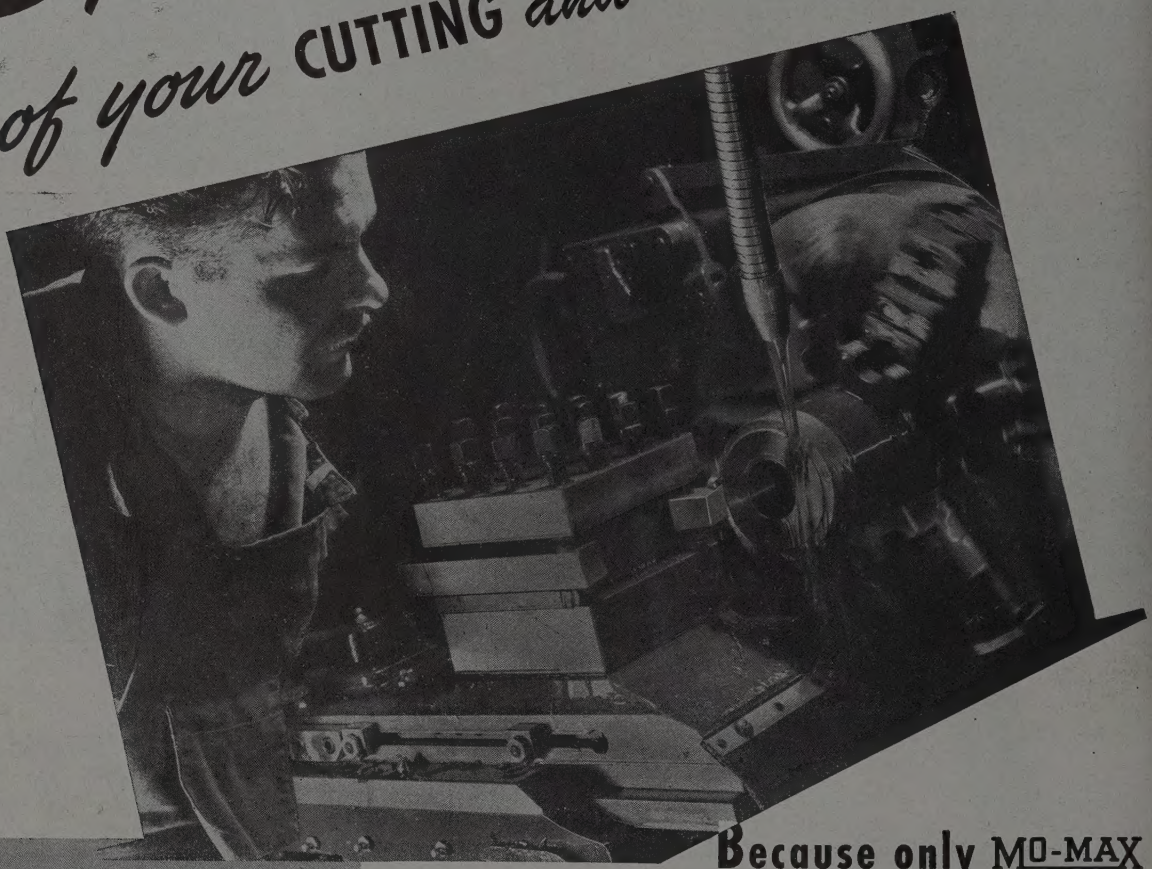
THE DENISON ENGINEERING CO., 1163 DUBLIN RD., COLUMBUS 16, OHIO

DENISON EQUIPMENT in APPLIED HydrOILics

TRADE-MARK

HydrOILics INDUSTRY'S RIGHT HAND

Specify MO-MAX HIGH SPEED STEELS *for all of your* CUTTING *and* TURNING TOOLS



Because only MO-MAX GIVES YOU *ALL* THESE ADVANTAGES...

1. MO-MAX has superior cutting qualities.
2. The machinability of MO-MAX is unexcelled.
3. MO-MAX is economical. Its specific gravity is about 8% less than that of 18% tungsten steel.
4. MO-MAX is available in a standardized composition; also in cobalt and high vanadium varieties for special high speed steel requirements.
5. For 14 years MO-MAX has demonstrated its superiority in all types of cutting tools.

Learn all the facts! **Send for your copy of the MO-MAX Handbook, sixth edition. Get the full story about this remarkable steel, including easy-to-follow instructions on heat treating.**

Buyer's Guide to Brands of MO-MAX

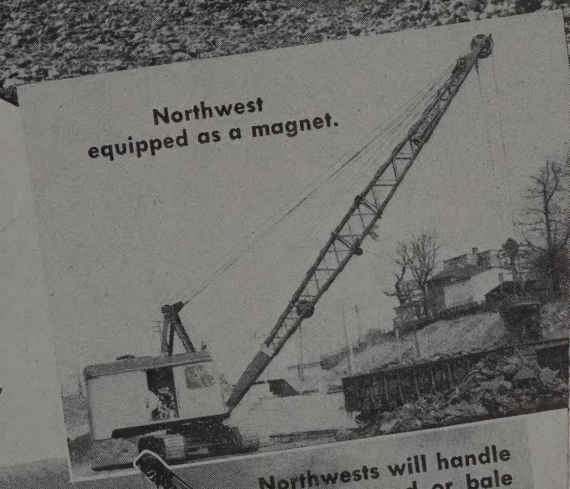
"LMW"	Allegheny Ludlum Steel Corporation
"MOHICAN"	Atlas Steels Limited
"BETHLEHEM HM"	Bethlehem Steel Company
"MO-CUT"	Braeburn Alloy Steel Corporation
"STAR MAX"	Carpenter Steel Company
"MOLITE M-1"	Columbia Tool Steel Company
"REX T-MO"	Crucible Steel Company of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Halcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Company
"MIDMAX"	The Midvale Company
"S. T. M."	Simonds Saw & Steel Company
"MO-TUNG"	Universal-Cyclops Steel Corporation
"8-N-2"	Vanadium-Alloys Steel Company
"VUL-MO"	Vulcan Crucible Steel Company

THE CLEVELAND TWIST DRILL COMPANY

1258 East 49th Street • Cleveland 14, Ohio

THE PROBLEM—

of handling loose materials!



What is your material handling problem? Is it limestone, sand, gypsum, slag, phosphate, feldspar, fluorspar, coal — or any of the many loose materials that must be handled from car to stockpile or warehouse and then to plant for processing?

Your Northwest Crawler Crane will handle the job smoothly, quickly and without any need of tracks or accessory equipment. Your Northwest goes anywhere. It can unload a whole train of cars on a single track siding without switching the cars out of the way. It gives you full 180° coverage and materially increases the capacity of your storage area. It will climb piles, load trucks and by changing from clamshell equipment to other material handling equipment, it will do practically any material handling job required around any plant.

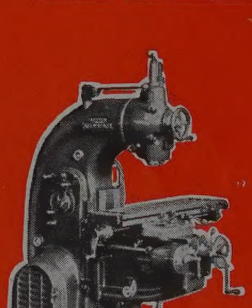
NORTHWEST ENGINEERING COMPANY
1508 Field Building, 135 South La Salle Street, Chicago 3, Illinois

NORTHWEST

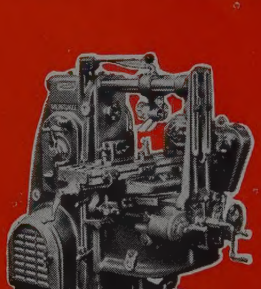
The Crane that goes Anywhere!

4 to 44 tons

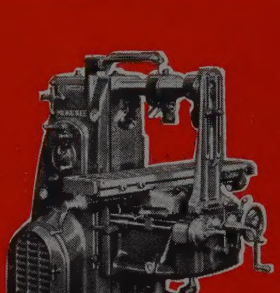
Big Choice Gives



MODEL 1H Swivel Head Vertical —Also available in Plain, Universal, Automatic Cycle Plain and 18" Manufacturing types.



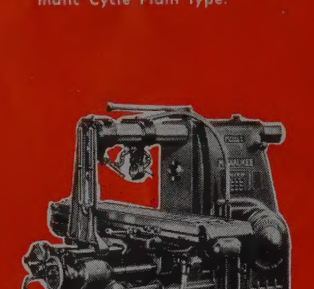
MODEL 2HL Universal — Also available in Plain and Swivel Head Vertical types and in Automatic Cycle Plain type.



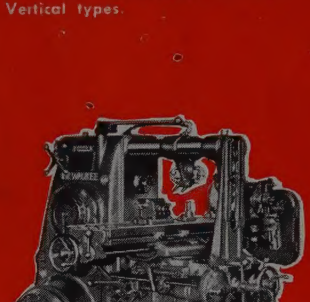
MODEL 2H Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types.

MODEL 3H Universal—Also avai able in Plain and Vertical typ and in Automatic Cycle Plain a Vertical types.

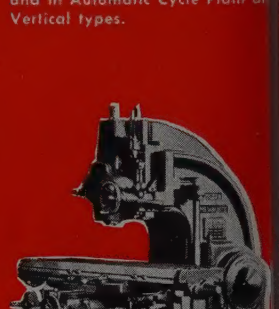
MODEL 2K Vertical Automatic Cycle—Also available in Plain and Vertical types and in Automatic Cycle Plain type.



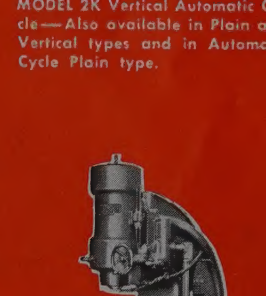
MODEL 3KM Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types



MODEL 3K Universal—Also available in Plain and Vertical types and in Automatic Cycle Plain and Vertical types.

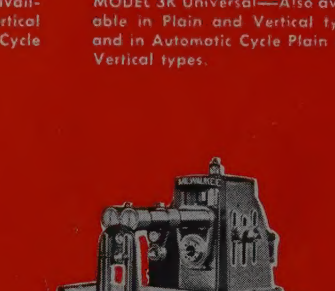


MODEL 4K Vertical—Also avai able in Plain and Universal typ and in Automatic Cycle Plain a Vertical types.

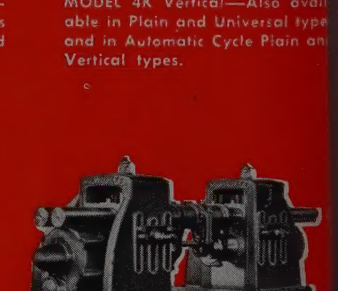


MODEL 50 CSM Vertical — Also available: Plain and Automatic Cycle Plain and Vertical types. Choice of 2 working ranges.

MODEL M-24 Simplex—Available with 18" - 24" or 30" longitudinal travel to table — in Simplex models only.

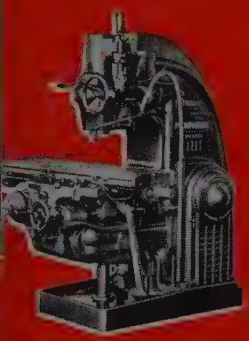


MODEL 1200 Simplex—Available in both Simplex and Duplex models with 24" - 36" or 48" longitudinal travel to table.

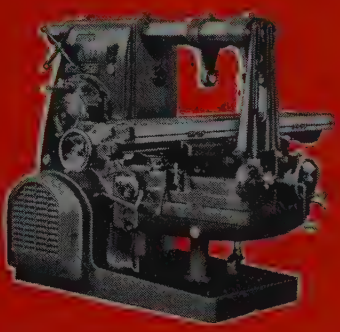


MODEL 1800 Duplex—Availabl in both Duplex and Simplex mod els. Choice of 24" - 36" - 48" 54" longitudinal travel to tabl

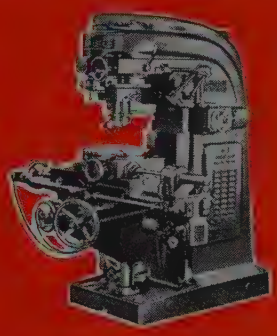
You Better Buy!



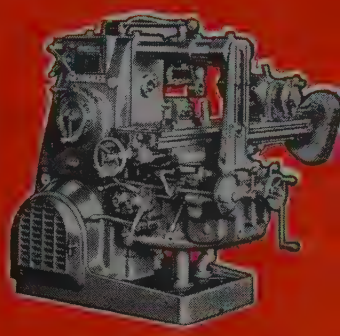
ODEL 4H Vertical—Also available in Plain and Universal types and in Automatic Cycle Plain and Vertical types.



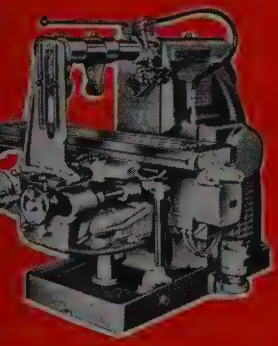
MODEL 5H Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types.



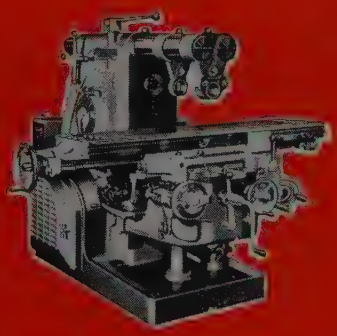
MODEL 3D Rotary Head Milling Machine—One size and working range only. Especially suited to precision tool and die work.



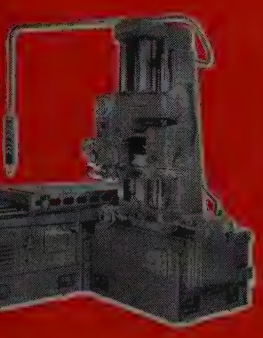
MODEL 2KH Universal — Also available in Plain and Vertical types and in Automatic Cycle Plain and Vertical types.



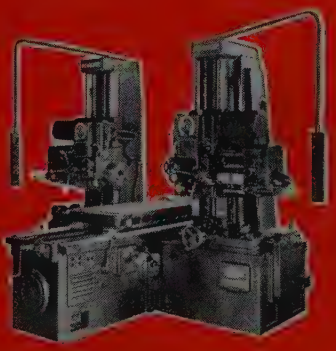
OBEL 20 CSM Plain—Also available in Vertical and Automatic Cycle Plain and Vertical types. Choice of 2 working ranges.



MODEL 30 CSM Plain Automatic Cycle—Also available Plain, Vertical and Automatic Cycle Vertical types. Choice of 2 working ranges.



No. 3T Precision Milling Boring Machine—Adjustable provides 12" travel for horizontal operations.



MODEL No. 3TT Precision Milling and Boring Machine—2 columns and headstocks for multi-operation work on single workpiece.

Kearney & Trecker

Milwaukee Milling Machines — 97 Different Models, Sizes and Types mean the right machine for your job

There's a Kearney & Trecker for every milling job — in small shops, high production plants or precision tool rooms. Horsepowers range from 3 to 50 with wide working ranges and broad feed and speed ranges to suit.

Model K machines are general all-purpose machines. Model H machines are the intermediate type. The new CSMs are the most powerful standard milling machines ever built — specifically designed for carbide milling of steel, but suited for all-purpose work as well. For high speed production you can get the Manufacturing types in conventional, Simplex and Duplex models.

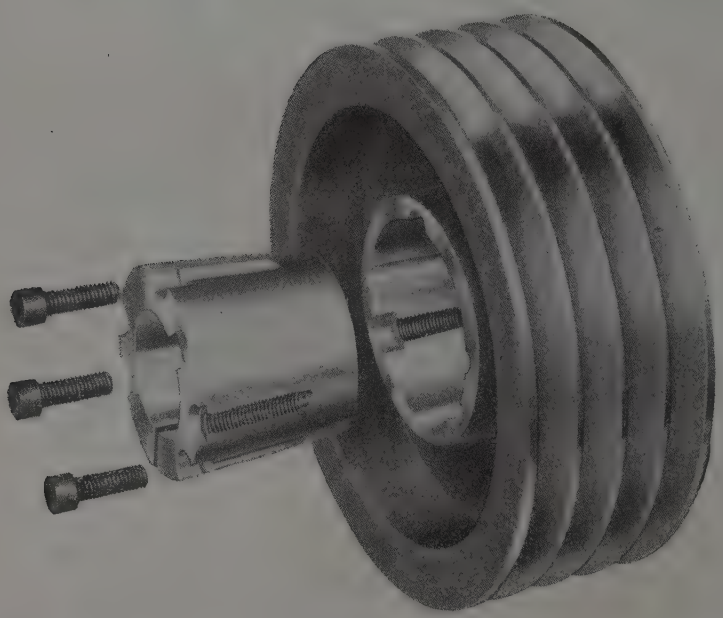
You'll find the Rotary Head Milling Machine and Models No. 3T and 3TT Precision Milling and Boring Machines are ideal for the specialized shop. To meet unusual or special machine requirements, there's Kearney & Trecker Customer Engineering Service where you get the benefit of nearly fifty years experience in precision and production machine tool design and manufacture.

Catalog E-53 gives you complete data on our entire line — Write for it! Please indicate your business connection.

KEARNEY & TRECKER
CORPORATION
Milwaukee 14, Wisconsin

479-A

TAPER-LOCK BRAND



THE NEW TIME-SAVING TAPER BORE SHEAVE

TAPER-LOCK has the simplest, surest mechanism ever devised for holding wheels to shafts...TAPER-LOCK saves time. You slip it on the shaft, line it up and tighten while sighting...TAPER-LOCK runs true. It holds with a firmness equivalent to a shrunk-on fit, yet it disengages with less effort than any other sheave.

TAPER-LOCK sheaves are available in all the most wanted sizes. Thus Dodge has not only created a great new product in the power transmission field, but has made this product adaptable to needs throughout industry.

TAPER-LOCK is a striking example of the new Dodge products which help you put more power on the job — cut costs and increase production. The savings which Dodge equipment make possible will be important to you in the competitive days ahead. Get the full story — now.

DODGE MANUFACTURING CORPORATION
MISHAWAKA • INDIANA

IN ALL THESE STOCK SIZES:

CLASS SHEAVE	PITCH DIAMETER	NUMBER GROOVES	TOTAL SIZES
DUAL DUTY "A"	3.0 to 18.0	1 to 6	150
DUAL DUTY "B"	4.6 to 18.4	1 to 6	114
B	5.4 to 38.0 20.0 to 38.0	7 to 10 2 to 10	76 36
C	9.0 to 44.0	3 to 10	128
D	13.0 to 33.0	4 to 10	77

DODGE
of Mishawaka, Ind.

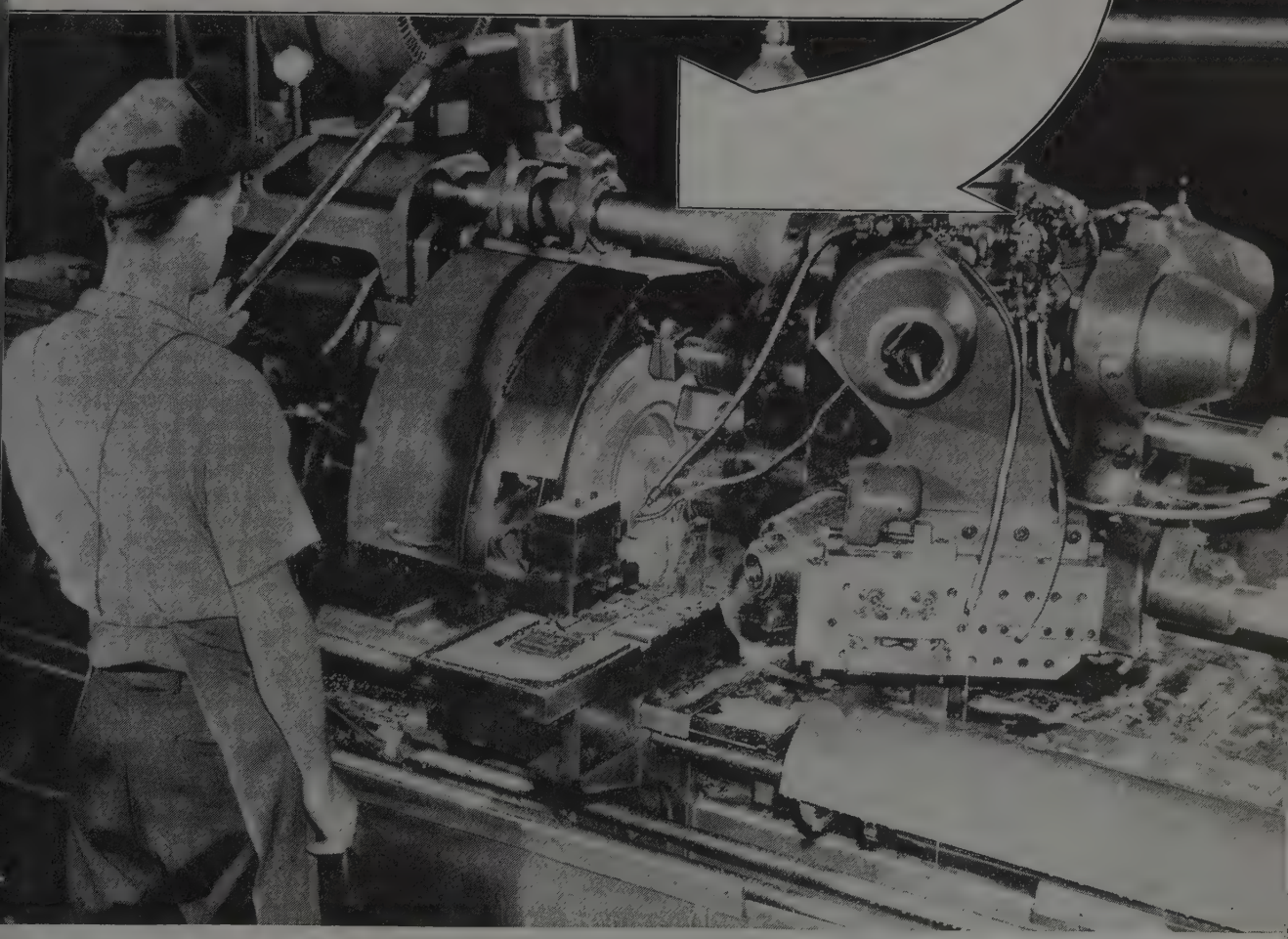
CALL THE TRANSMISSIONEER

He's a factory-trained specialist qualified to analyze your mechanical power transmission needs and recommend correct equipment. Consult him without obligation. Look for his name under "Power Transmission Equipment" in your classified telephone directory.

Copyright, 1947, Dodge Mfg. Corp.

NAME PLATES
FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

Removing 27 lbs. of metal—*FAST* with the *FASTERMATIC*



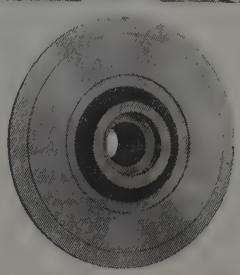
• Here's the kind of operation that makes this automatic turret lathe ideal to put heavy chucking work on a swift production basis.

With multiple tooling on the cross slides and turret faces, this Fastermatic removes 27 pounds of metal from a 95-pound steel casting in 17 minutes including turret indexing time. During this completely automatic cycle, close tolerances are obtained in boring and outside turning—and a total of 15 cuts are taken.

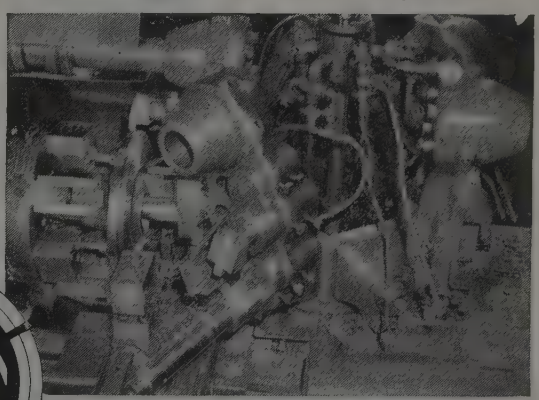
It's another example of the way that power and multiple tooling can be applied on the Fastermatic to handle a larger number of operations in one chucking. With a completely automatic machining cycle, quick indexing, fast traverse, and automatic feed changes, the Fastermatic cuts idle time to a minimum—cuts costs to the bone.

Ask for facts on how the Fastermatic can cut costs on your specific work.

Rough Casting



Semi-finished



Close-up of Fastermatic tooling for machining 95 lb. transmission carrier. The Fastermatic has the power and rigidity for heavy chucking work and the permanent accuracy for precision in all work.

GISHOLT MACHINE COMPANY
1245 *E. Washington Ave.* • *Madison 3, Wis.*

Look Ahead . . . Keep Ahead . . . with Gisholt

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

SIMONDS Red Tang FILES

...they keep your File-Costs down

RED TANG FILES have the same basic tooth-design as Simonds Metal-Cutting Saws. So Red Tangs *cut,* instead of *scrape* . . . remove more metal with less elbow-grease. That's why workers like them. *And here's why YOU will like them:* They last longer . . . and deliver more and better work per file-dollar. Order Simonds Red Tank Files from your Industrial Supply Distributor, or from the nearest Simonds office listed below.

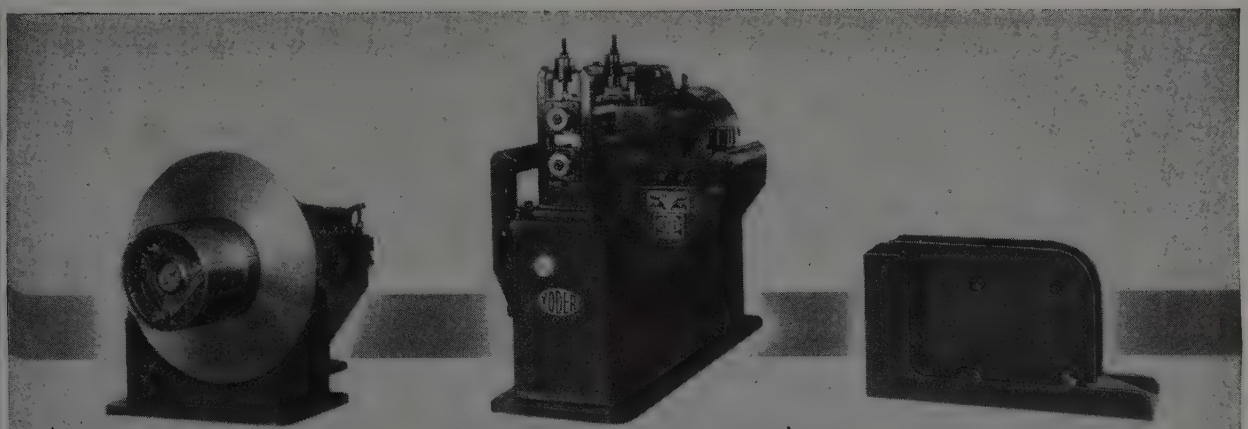
BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Avenue, Spokane 8, Washington; *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.
Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry

SIMONDS STEEL MILLS — LOCKPORT, N.Y. — *Special Electric Furnace Steels*

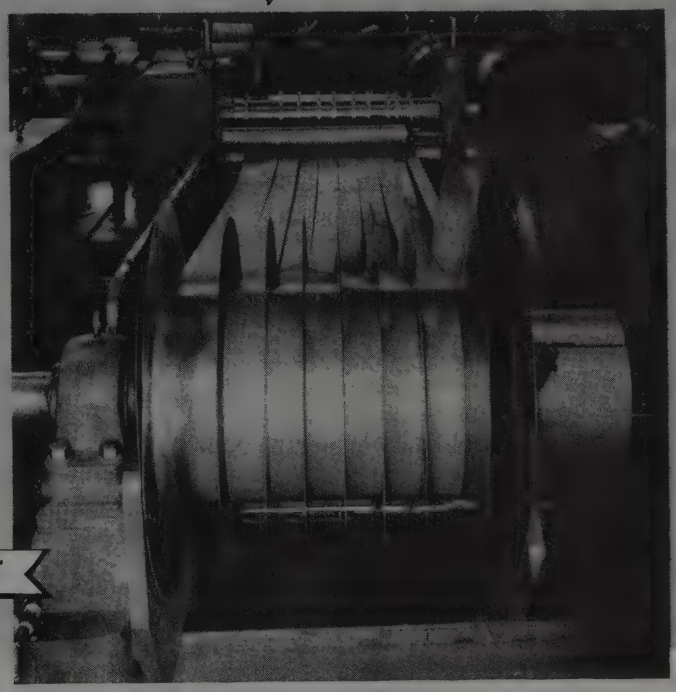
SIMONDS ABRASIVE CO. — PHILADELPHIA, PA. — *Grinding Wheels and Grains*

SIMONDS CANADA SAW CO. LTD. — MONTREAL, TORONTO, VANCOUVER, SAINT JOHN, N.B. — *Simonds Products for Canada*



PULL-THROUGH RECOILERS GANG SLITTERS UNCOILERS *and* COIL BOXES

YODER *Standardized* SLITTING LINES



HIGH SPEED • LOW COST

Profiting by long and extensive experience in designing and building slitting lines to meet individual requirements, often involving heavy engineering expense, Yoder offers the best features of all combined in a standardized series for handling sheets and strip up to .125″ thick and 36″ wide. For speed, precision, ease of control, simplicity and rugged construction, this series stands unsurpassed. At the same time, important economies in engineering and manufacturing cost, achieved through standardization, are shared with the purchasers.

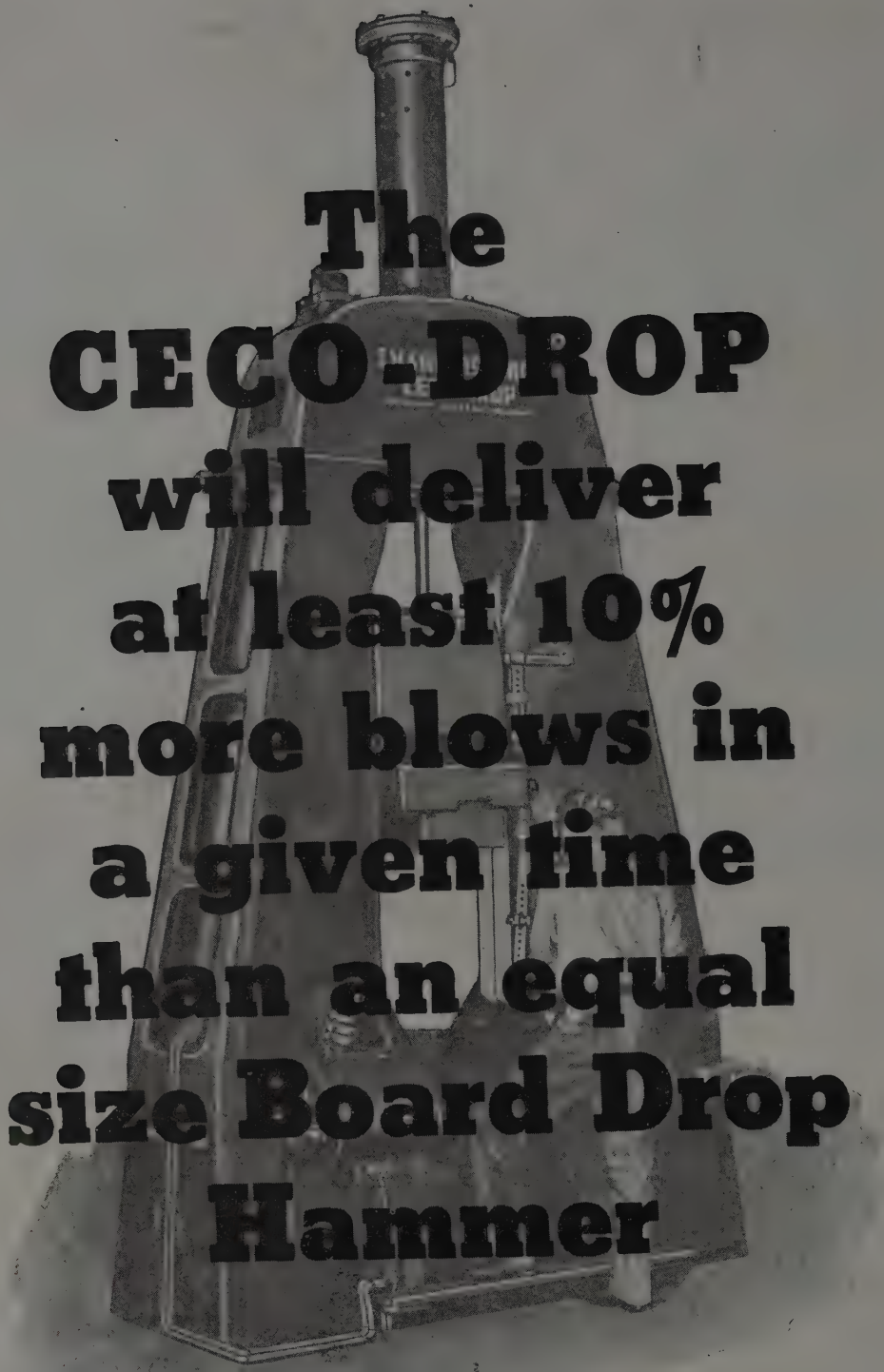
The benefits of standardization are also being extended to Yoder slitting lines of larger capacities.

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING

ROLL FORMING AND TUBE MILL MACHINERY

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSING • CURVING • WELDING • CUTTING-OFF



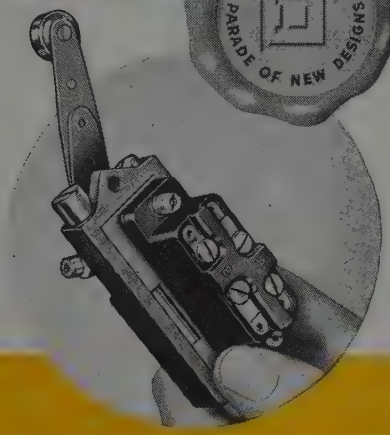
The CECO-DROP will deliver at least 10% more blows in a given time than an equal size Board Drop Hammer

CHAMBERSBURG
Builders of IMPACT Machinery

1897 ★ Fiftieth Anniversary ★ 1947

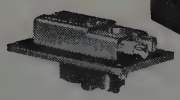
CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PENNA.

Square D's *Precision Snap Switch* in oil-tight limit switch enclosures *for Machine Tool Applications*



At left—Surface mounted, lever operated Class 9007, Type AW-12 limit switch.

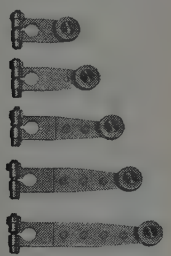
Above—Cover of limit switch removed to show mounting of precision snap switch and four terminal posts.



TYPE AF-22 • Flush Mounting • Push-Rod Operated.

TYPE AF-12 • Flush Mounting • Lever Operated.

TYPE AW-22 • Surface Mounting • Push-Rod Operated.



OPERATING ARMS • Available with 5/8" to 1/4" Standard Roller or Special Rollers.

The New Limit Switch is a "natural" for machine tool applications. Completely oil-tight, gasketed, die-cast enclosure • Mechanism requires only 5° travel to trip and provides 25° overtravel • Operating arms adjustable to any position around a circle and available in five lengths • One-way and other special rollers available • Return springs easily reversed for either clockwise or counter-clockwise lever operation or removed for maintained contact action • Surface and flush mounting arrangements with either roller arm or push rod operated mechanisms meet virtually any mounting and application requirement • Box of surface mounted arrangement can be rotated to provide conduit entrance at either end of switch.

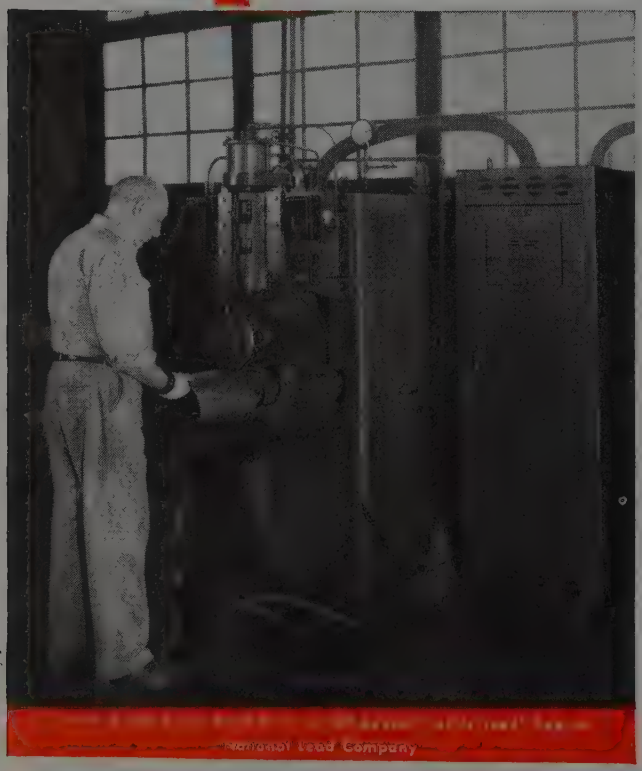
The Precision Snap Switch operating mechanism consisting of only two alloy leaf springs has no dead center position and gives exceptionally long life • Stainless steel compression return spring insures positive operation and reliable service • Husky highly arc resistant melamine case • Heavy contact blade separate from operating mechanism • Terminals, suitable for No. 14 wire • Separate normally open and normally closed circuits have double break silver contacts.

Write ***Square D Company, 4041 N. Richards St., Milwaukee 12, Wisconsin.***
Or ask your nearby Square D Field Engineer to show you a sample.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

GENERAL ELECTRIC WELDING CONTROLS Have Given National Lead *Better Quality in Less Time . . . Little Maintenance*



Says Mr. Gerst, Plant Superintendent of the Steel Packaging Works of the National Lead Company: ***"We are well pleased with the General Electric controls. They have done a fine job.*** During the war, these controls were in continuous operation 16 hours per day, 6 days per week. Since we first installed them, they have required very little maintenance."

G-E synchronous precision controls helped increase National Lead's war production of 75 mm ammunition containers for the Government, and now, they are assuring a better quality of weld, reduced costs, and increased production of 100-pound kegs for packaging white lead in oil.

In addition to improved work quality and reduced production time and cost, this control has increased the life of the electrodes and reduced installation space.

A NEW, IMPROVED Line of Synchronous Precision Control

● Now, General Electric is featuring a new line of synchronous control which offers:

1. Savings in installation time—all controls are factory-wired, and included in one cabinet.

2. Easy installation—control cabinet is designed for side mounting on welding machine, within easy reach of operator.

3. Convenient servicing—cabled wiring and rack-mounted resistors provide easy access.

For further details, ask your local G-E office for bulletin GEA-4699.

HAVE YOU SEEN—

"This Is Resistance Welding," G.E.'s 30-minute, full-color movie? Your local utility or G-E office will be glad to arrange a free showing for you. Apparatus Department, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

It's UNIFORMITY that counts in a free cutting rod

Uniformity of dimension, shape and surface smoothness are readily evident in a free cutting rod. Not so obvious, however, but far more important to the manufacturer of screw machine products, are those desirable but unseen characteristics; uniform *composition*, uniform *temper* and uniform *metal structure*. For on these depend the physical properties of the part, the excellence of its machined finish, and the economy of its production through sustained high cutting speeds.

The American Brass Company produces a large number of Anaconda Copper and Copper Alloy Rods in all commercial sizes and shapes suitable for screw machine use. Sixteen are free cutting alloys. The "special purpose" properties of six of these are indicated on the following page.

47113

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA

from mine to consumer

Anaconda **FREE CUTTING RODS**

What do you need most in a FREE CUTTING ROD

- **Maximum Machinability?** Free Cutting Yellow Brass 271. The standard all-purpose rod of the screw machine industry; economical, versatile, ranking highest in machinability.

- **High Electrical Conductivity?** Leaded Copper 946. A truly free cutting copper rod having a minimum electrical conductivity of 95% I.A.C.S. in commercial hard temper.

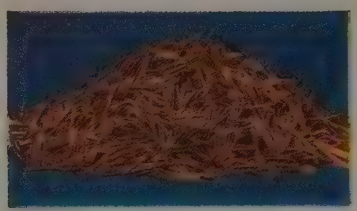
- **Good Bearing Qualities?** Special Free Cutting Phosphor Bronze 610. Combines typical "phosphor bronze" bearing qualities with machinability close to that of yellow brass.

- **High Strength and Toughness?** Everdur* 1012. This rod provides the toughness, high strength and corrosion resistance of copper-silicon alloys with ready machinability. *Reg. U. S. Pat. Off.

- **A Ductile, Silvery White Alloy?** Leaded Nickel Silver 12% 796. Strong, tough and durable, this silvery white alloy is free cutting, yet ductile enough in proper temper to permit cold forming or spinning.

- **High Resistance to Corrosion Cracking?** High Strength Commercial Bronze 286. A relatively new Anaconda Rod combining high strength (70,000 lb. per sq. in. commercially hard drawn, up to 1") with excellent machinability and unusual resistance to corrosion cracking.

Compositions, physical properties, constants and machinability ratings of all Anaconda Free Cutting Rods are listed in Publication B-14. Practical suggestions for machining copper and copper base alloys are included in Publication B-3. Either one or both will be mailed on request.



Chips machined without coolant from High Strength Commercial Bronze 286. Depth of cut, .375"; feed, .003". Illustration two-thirds scale.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

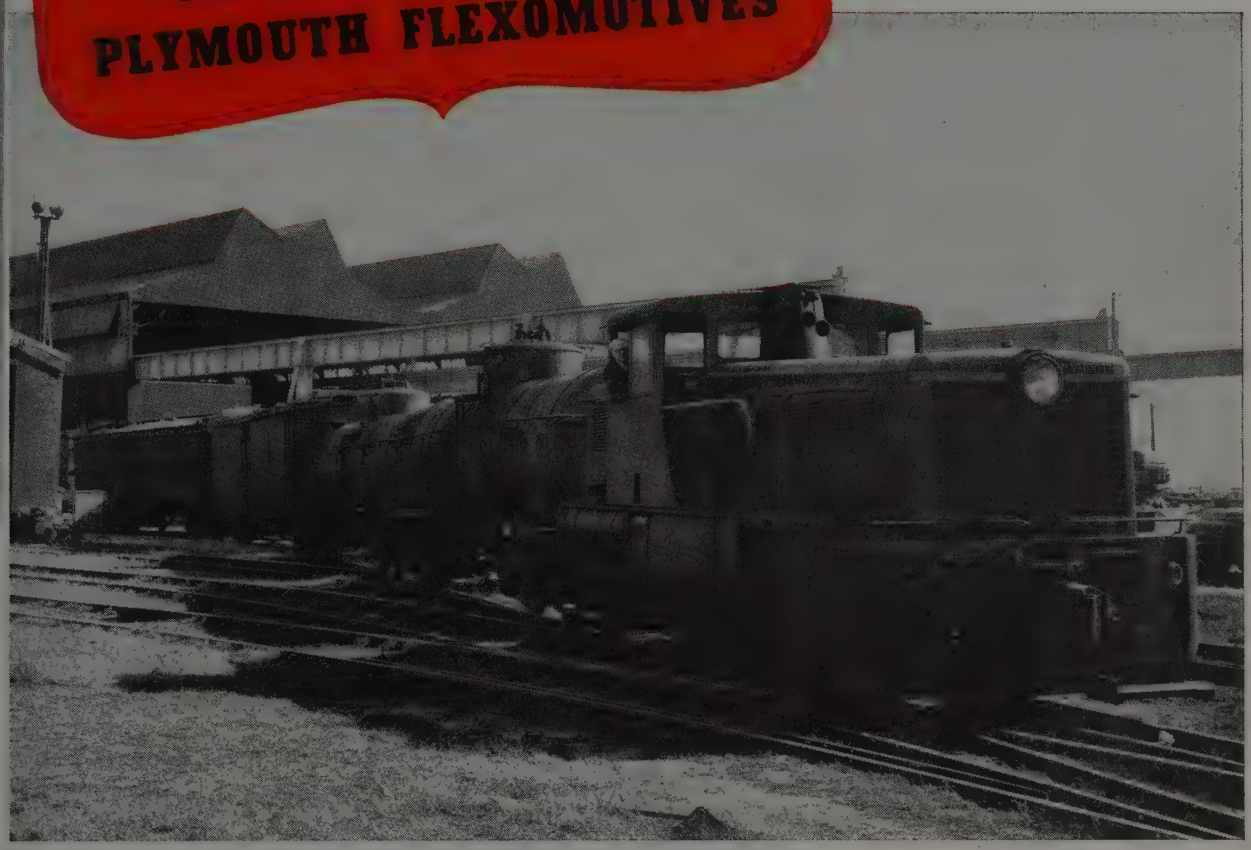
Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA from mine to consumer

Anaconda **FREE CUTTING RODS**

For Heavy Haulage
PLYMOUTH FLEXOMOTIVES



Here's the answer to heavy intraplant transportation problems—the powerful, rugged Plymouth Flexomotive! The 65-ton, Diesel-powered Flexomotive above is one of three units serving the General American Transportation Corporation at its East Chicago, Indiana, plant.

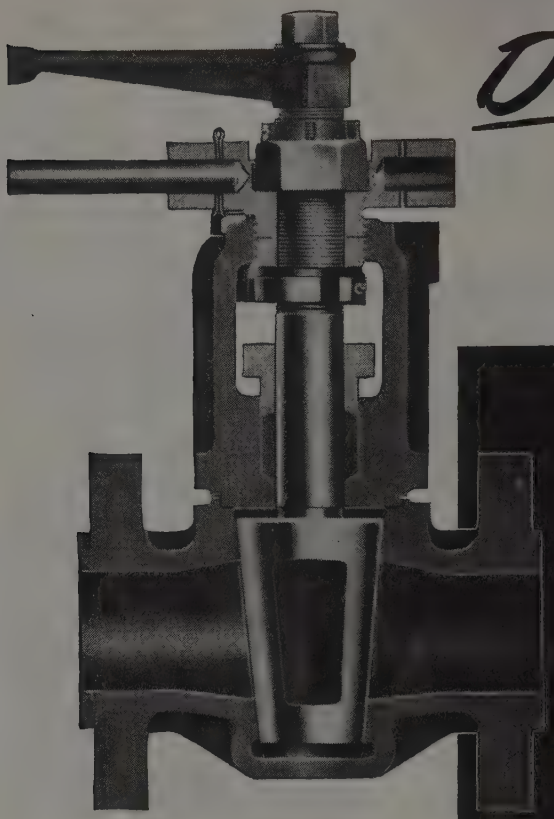
That GATX, nationally-known manufacturer and operator of specialized railway freight cars, should choose Plymouth to handle all yard rail transportation assignments, is of interest to anyone confronted with plant haulage problems.

Plymouth Locomotives, the choice of men who know haulage problems, are built to provide the efficient, low-cost service you need. There's a Plymouth to meet your requirements. Write for details. . . Dept. A-1, Plymouth Locomotive Works, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

ELIMINATE VALVE FAILURES



Due to CORROSION
TEMPERATURE AND
PRESSURE EXTREMES

with

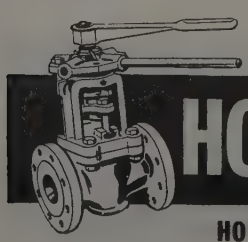
HOMESTEAD
LEVER-SEALD
VALVES

They're Stick proof... Here's Why:

1. INSTANT STICK-PROOF OPERATION.
2. Quarter-turn fully opens or closes.
3. Positive mechanical seal.
4. Seating surfaces always protected in both open and closed positions. Corrosion practically eliminated.
5. Unobstructed straight-line fluid flow.
6. All operating parts protected from damaging effects of service conditions and weather.

Built into every valve is a *powerful lever-and-screw device* which relieves seating pressure between valve plug and body just enough to prevent friction and permit *easy turning at all times and under all conditions.* This exclusive LEVER-SEALD mechanism assures never-failing stick-proof operation no matter what the line contents are or how long the valve has remained in an open or closed position. Operation is positive even at temperatures as low as 40° below Zero or as high as 1120°Fahrenheit, at pressures from vacuum to 1500 pounds. The absolute reliability of HOMESTEAD LEVER-SEALD VALVE operation has kept them favorites for over 15 years, for difficult applications where temperature extremes, pressure and the corrosive action of line fluids render ordinary valves inoperative.

HOMESTEAD LEVER-SEALD VALVES are made in combinations of metals and alloys, such as stainless steel, Monel Metal, Ampco Metal. Ni-Resist, Durimet, etc., to meet your service requirements in sizes 1½" to 10". Write for complete details and Valve Reference Book No. 38.



HOMESTEAD LEVER-SEALD VALVES

HOMESTEAD VALVE MANUFACTURING CO. • P. O. BOX 22 CORAOPOLIS, PENNA.

PLYMETL MATERIAL OF OPPORTUNITIES

COMBINES THE BEST QUALITIES OF WOOD AND STEEL . . . . . .

Haskelite Plymetl unites the light weight and rigidity of plywood with the strength of various metals. To one or both faces of a plywood plaque or insulating board, a thin sheet of metal is permanently bonded by an exclusive Haskelite process. Plymetl panels are made faced with monel metal, stainless steel, porcelain enamelled steel, aluminum, and other types of metal alloys. This offers the designer and engineer a versatile family of structural materials of new opportunity for the design of better, more salable consumer and industrial products.

Write for samples of Plymetl and bulletin SC 45 for complete data on other types of Haskelite materials.

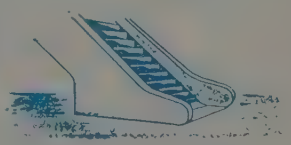
NEW SCOPE FOR THE DRAWING BOARDS OF AMERICA'S DESIGN ENGINEERS

For over 25 years, Haskelite Plymetl has found extensive use on a wide variety of products. A few typical installations are described below.

Plymetl Coach and Dining Car partitions and Diesel Locomotive side panels cut dead weight from our modern, high speed, streamlined trains.

Plymetl's light weight and great strength are ideally suited to the construction of all types of trucks and truck trailers, contributing to a lower cost operation and greater load capacity.

Bakery proof boxes, bread coolers, ice cream cold cabinets, and counters are fabricated at a saving in man-hours, and the use of Plymetl assures a better appearance and longer life.



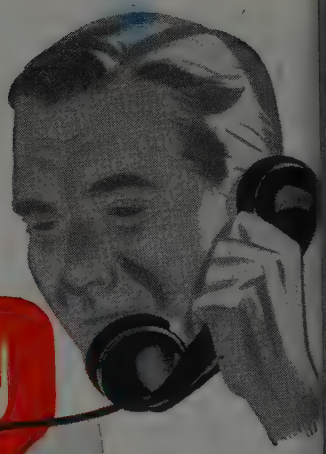
Plymetl panels faced with aluminum, zinc-coated steel, or porcelain enamelled steel have contributed greatly to lower cost construction and efficient operation of escalators and elevators.

HASKELITE

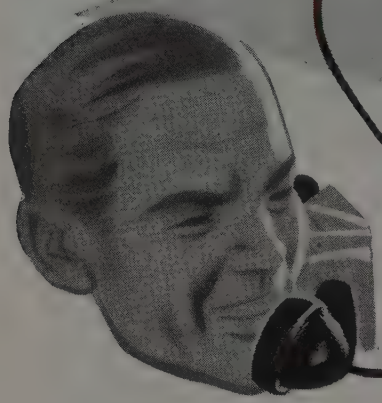
MANUFACTURING CORPORATION

Dept. S, GRAND RAPIDS 2, MICHIGAN

NEW YORK CHICAGO CLEVELAND ST. LOUIS
PHILADELPHIA LOS ANGELES DETROIT
CANADA: Railway & Power Engineering Corp., Ltd.



SAE 950?



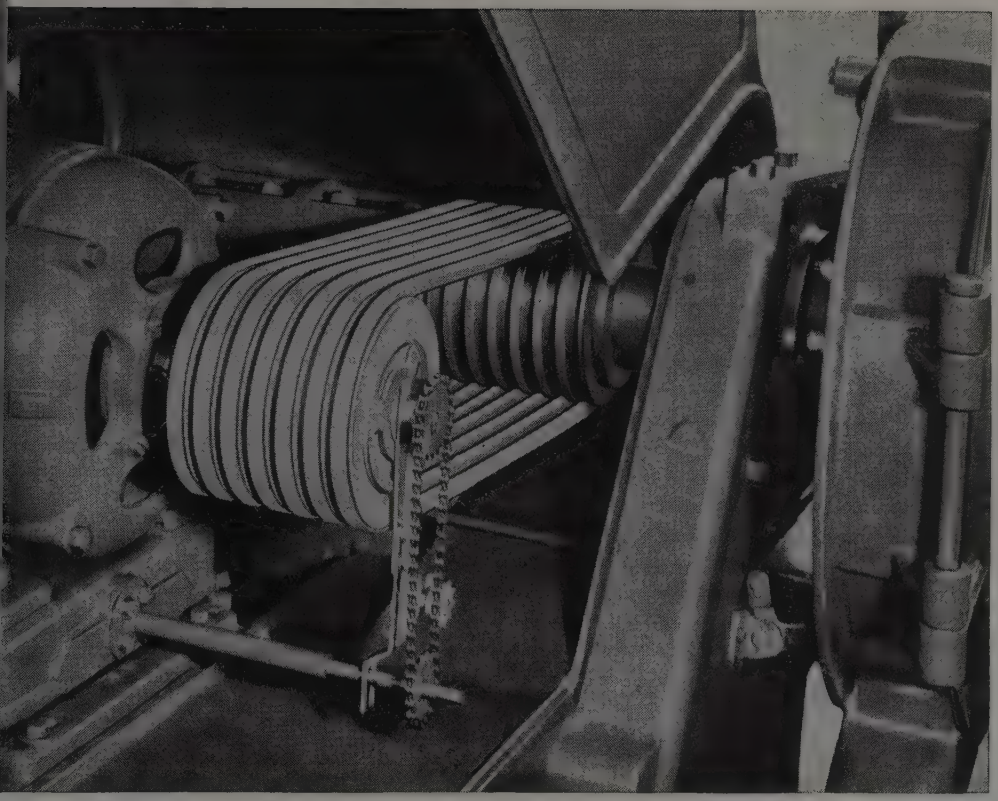
N-A-X high-tensile

When specifications call for SAE 950, you have the right answer in N-A-X HIGH-TENSILE. This low-alloy steel—with inherently finer grain structure—has demonstrated its outstanding properties in factory after factory: high strength, good formability, excellent weldability, high fatigue-resistance, great impact toughness, high corrosion-resistance. Think of N-A-X HIGH-TENSILE when you think of SAE 950. It's a great steel to work with.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify
NAX
HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION



Texrope *VARIABLE* Speed Drive ... the practical way to get *Accurate Speed Control*

- To regulate a machine tool to suit variations in job, material, or individual workman
- To control the volume of air from heating and ventilating fans
- To vary the speed of a pump, spinning frame, conveyor, rock crusher or grinding wheel
- *Wherever* the ability to change operating speeds at will can add to efficiency, output or economy —

Install Texrope Variable Speed Drives!

These flexible drives use economical constant speed motors. They provide infinite speed variations within their ranges — quickly, easily, accurately.

Vari-Pitch sheaves using A, B, C, D or E belts are available for stationary or motion control, with range up to 25% per sheave; *Vari-Pitch* sheaves using Q or R wide belts allow variations up to 100%; *Vari-Pitch* speed changers permit ranges up to 375%. There are types and sizes to suit all needs, from fractional to 300 hp!

Texrope offers the *most complete* line of variable speed drives made ... engineered and built by Allis-Chalmers, originator of the multiple V-belt drive. See Sweet's Catalog, or call your nearby A-C office or dealer for Bulletin 20B6051G. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

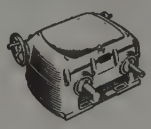
A 2200

TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

What's Cooking?

GLEAMING FABRICATED "STAINLESS"

on a "black-iron" production line thanks to . . .

LIQUID ENVELOPE

PEELABLE PROTECTIVE PLASTIC FILM

T.M. BFC

FREE
STAINLESS STEEL ASH TRAY

Stamped from 18-8 Eastern Stainless Polished blank coated with "LIQUID ENVELOPE", sent with our compliments (together with illustrated folder) to show you how amazingly this tough-plastic film protects.

Gleaming VULCAN STERLING stainless steel commercial ranges, ovens, broilers! At the plant of Standard Gas Equipment Corp., Baltimore, Md. polished stainless sheet coated with "LIQUID ENVELOPE" is sheared, brake bent, stamped, welded, punched and assembled without a blemish . . . handled as casually as inexpensive "sheet iron" with worthwhile economies to the manufacturer and his customers.

If you, too, wish to completely eliminate die marks, scratches, etc. commonly caused by forming and assembly operations on Stainless, Monel, Aluminum, Magnesium, Brass Copper Sheet, investigate "LIQUID ENVELOPE". Film as thin as .001 — .002" cushions dies, lengthens die life, minimizes die dressing, reduces pressures, eases bends, cuts scrap, saves polishing out imperfections, protects work during assembly . . . cuts cost on any metal-forming operation. Easy and economical to cold-spray and peel off . . . peels as simply and easily as a banana!

BETTER FINISHES AND COATINGS, INC.

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122 EAST 7th ST., LOS ANGELES 14, CALIF.

HYDRAULIC DEEP DRAWING

WITH AN AUTOMATIC ALL OIL-HYDRAULIC DOUBLE ACTION PRESS

250/90 TON SELF-CONTAINED OIL-HYDRAULIC DOUBLE ACTION DEEP DRAWING PRESS

SUPPLIED TO THE ALUMINUM COMPANY OF CANADA LTD.

EASILY ADAPTABLE TO SINGLE ACTION OPERATION

FOR DEEP DRAWING

OF VESSELS WITH DIFFERENT DEPTHS AND SHAPES

OF LIGHT METALS AND STAINLESS STEEL

WITH HIGHEST ADJUSTABILITY OF SPEED AND PRESSURE
EASILY ACCESSIBLE QUICK SETTING OF DIES

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BY MEANS OF LIMIT SWITCHES

AUTOMATIC PRESSURE REVERSAL
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ACCURATE ALIGNMENT
ASSURED BY DEPTH OF SLIDE GUIDANCE

FOUR-CORNER-INDEPENDENT PRESSURE ADJUSTMENT OF BLANK HOLDER
FOR DRAWING VESSELS OF UNEVEN CONTOUR

AUTOMATIC — DETACHABLE — EJECTOR

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BUILT TO YOUR INDIVIDUAL REQUIREMENTS
WRITE FOR MORE INFORMATION

HYDROPRESS • INC.

ENGINEERS *CONTRACTORS*

HYDRAULIC PRESSES • ROLLING MILLS • PUMPS
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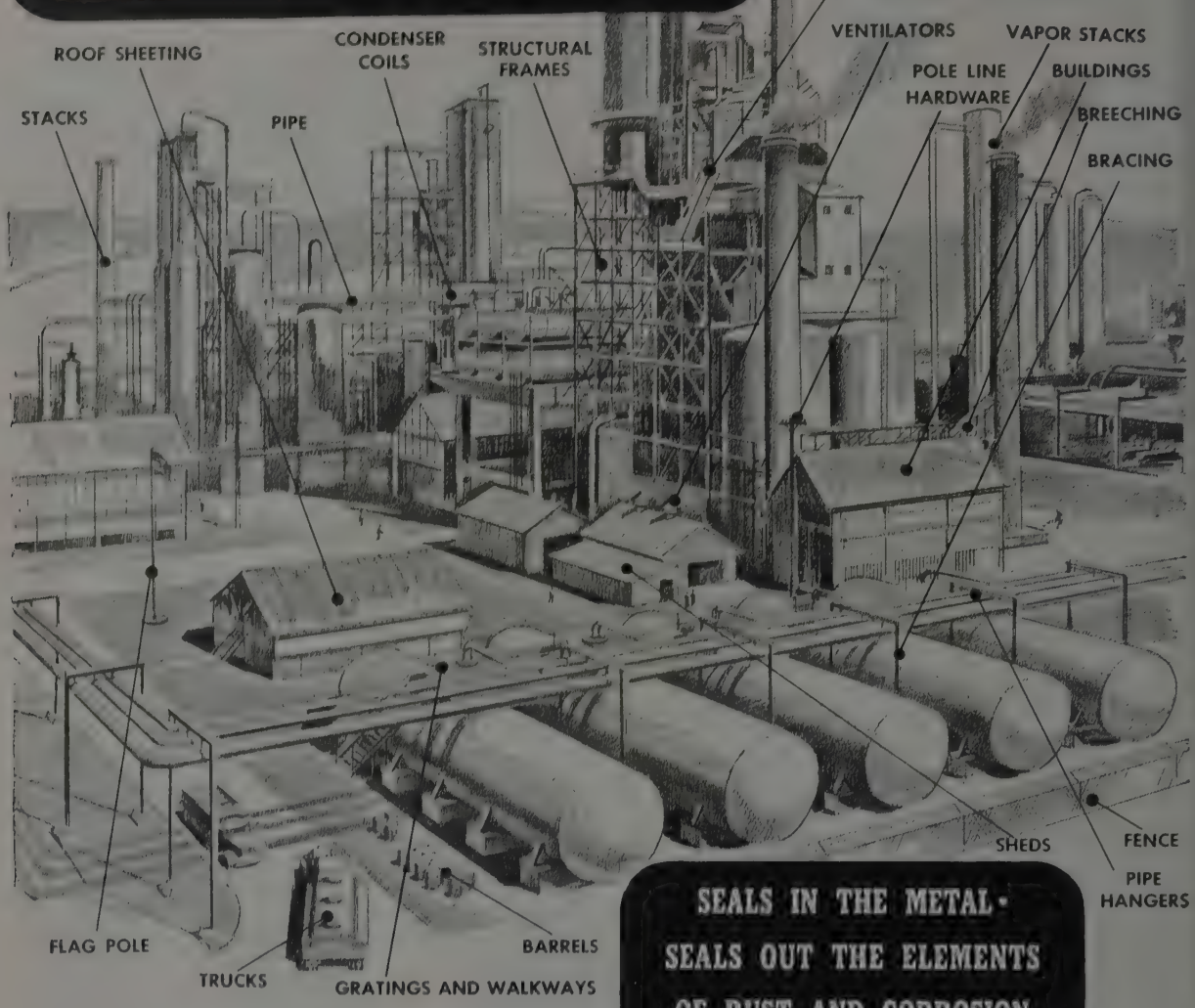
DETROIT SAN FRANCISCO SEATTLE WASHINGTON, D. C.

DIPPED IN MOLTEN ZINC

For the utmost in Rust Prevention



SEALS IN THE METAL · SEALS OUT THE ELEMENTS OF RUST AND CORROSION

Oil refineries and exterior plant installations that must give continuous service rely upon Hot-Dip Galvanizing to seal out destructive elements of rust.

Where uninterrupted service, maintenance and replacement costs are of first importance, Hot-Dip Galvanizing always proves its worth. The American Hot-Dip Galvanizers' method of immersing metal in molten zinc provides a definite iron-rich bond that holds the best possible coating of protective zinc to base metal.

Time-proved under every climatic condition, Hot-Dip Galvanizing pridefully points to accumulated evidence—throughout the years—that while metal is sealed in zinc by the American Hot-Dip Galvanizers' process it cannot rust.

Regarding problems of rust and corrosion write American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pa.

For the best Zinc Coating **use** **hot-dip GALVANIZING**

A VITAL COMBINATION—

ERIE Steam Hammers...

Hammergangs with years of "Know How"

HERE you merge the product of 50 years of research, design, craftsmanship in manufacture . . . Erie Hammers . . . with the alert keen-minded, quick moving Hammergang . . . To the end result of Better Forgings for the machines of industry, the transports of commerce, the prime movers of construction - This is American Teamwork at its finest . . . . . The Machine . . . The men.

Your copy of Erie bulletins on Erie Steam or Board Drop Hammers, Erie Single or Double Frame Forging Hammers or Erie Trimming Presses is available upon your request.

ERIE

ERIE FOUNDRY COMPANY, ERIE, PA.

ERIE BUILDS *Dependable* HAMMERS

CONFIDENCE..

Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

. . . . . how much is it worth?

IT WAS NINE YEARS before the first gasoline-driven automobile in the United States was operated by C. E. Duryea that the Brooklyn Bridge was opened in 1883. This fabulous engineering achievement was the culmination of over 26 years of planning and building, of bold vision and heart-breaking struggle, by John A. Roebling and his son Washington.

But the steadfast confidence of father and son in the success of their amazing venture is vindicated daily by the modern traffic this world-famous bridge continues to carry now . . . 64 years later.

How much is that confidence worth to you today . . . and to the John A. Roebling's Sons Company, now embarked on a multi-million dollar expansion program to meet the future's challenge?

Confidence is the driving power behind our efforts to make better products do better work for you.

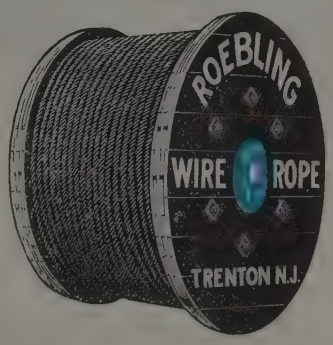
YOU CAN'T GO WRONG—IF YOU USE THE RIGHT "BLUE CENTER" ROPE

There's no better way to save wire rope dollars than to use the right rope for your job. That means the right grade of steel, the correct construction, the proper size. And your choice is easy when you specify Roebling "Blue Center" Steel Wire Rope.

In "Blue Center" you get what we feel sure is the finest rope steel made. Secondly, you have a wide range of constructions and sizes to choose from . . . in both preformed and non-preformed types.

Why not make the Roebling Field Engineer your right-hand man in selecting wire rope that will give you peak performance? Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities



The *RIGHT* steel . . .
The *RIGHT* construction . . .
The *RIGHT* size . . .
—FOR YOUR JOB!

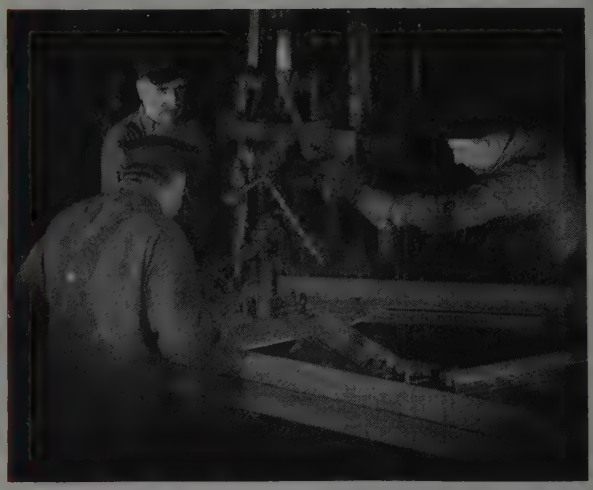
Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

JR ROEBLING

Here's what we mean by *Multiplicity Multiplicity* OF EQUIPMENT



THIS MANUFACTURING FLEXIBILITY *BREAKS* FABRICATING BOTTLENECKS...

(Repetition of advertisement as it substantially appeared in Fortune Magazine)

Riveters at work in three Allied plants at the same time give vivid demonstration of what we mean by multiplicity of equipment. Here is your assurance that fabrication jobs at Allied never choke in a bottleneck but rush to completion.

Each Allied plant is a completely equipped unit. When riveting, welding, or any process in the fabrication of steel or aluminum overloads one plant, Plant 2 or Plant 3 or both take over. Here the job is completed on the same type of equipment, under the same skillful control.

New time-saving techniques and unified control speed fabrication toward due-date deliveries. Both management and men are proud of the fact that those dates are invariably met.

Send your plans and specs to Allied for quotation. Thousands of tons . . . for bridges, buildings, or ships . . . or one-ton lots for smaller projects get the same careful consideration.

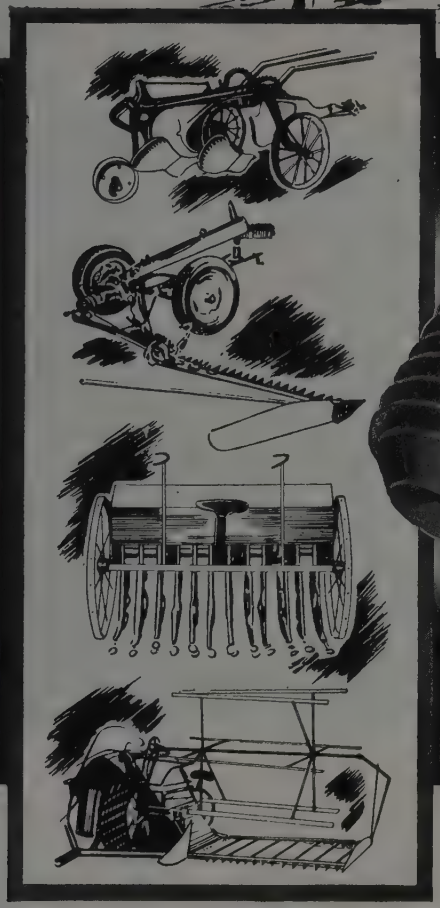
ALLIED "to Win in War or Peace"

STRUCTURAL STEEL COMPANIES

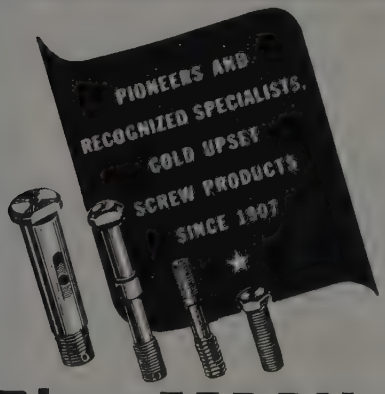
3 FABRICATING PLANTS

with Combined Facilities

Working as one Huge Corporation



SET Screws by FERRY CAP



To hold parts rigidly in place—and to provide for quick, easy adjustment—makers of farm equipment and other machinery manufacturers specify "Ferry Cap Set Screws."

These set screws are case hardened—the hard point *bites in* and *holds*. They fit perfectly and respond readily to adjustment needs.

"Ferry Cap Set Screws" are expertly made by the first company to produce Cup Point Set Screws by the cold upset process of manufacture. They embody the skill and experience gained in 38 years of precision manufacturing.

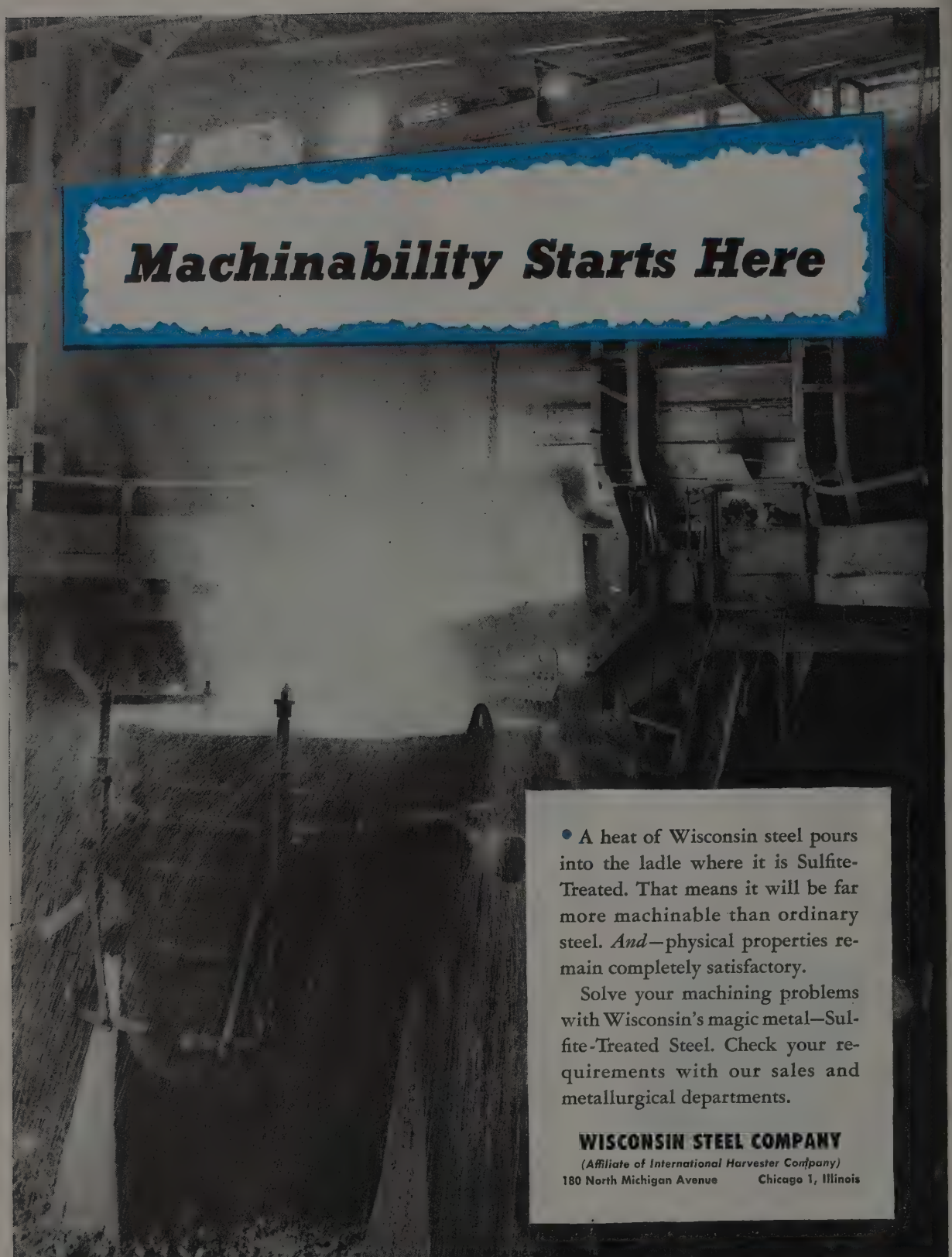
Square head and headless—cup and oval point—case hardened—sizes ¼" diameter and larger. Carried in stock for immediate shipment.

The FERRY CAP & SET SCREW Co.

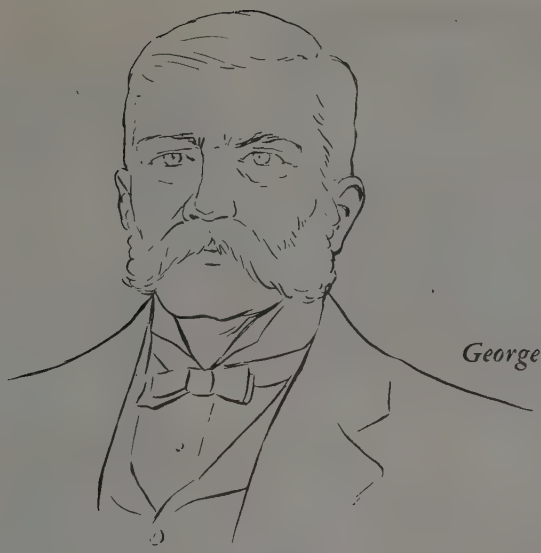
2159 SCRANTON ROAD Dept. A-14 CLEVELAND 13, OHIO

EXPORT MANAGER: ERNEST W. LENZ, 280 BROADWAY, NEW YORK 7, N. Y.

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS


Machinability Starts Here
• A heat of Wisconsin steel pours into the ladle where it is Sulfite-Treated. That means it will be far more machinable than ordinary steel. *And*—physical properties remain completely satisfactory.
Solve your machining problems with Wisconsin's magic metal—Sulfite-Treated Steel. Check your requirements with our sales and metallurgical departments.
WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL



George Westinghouse

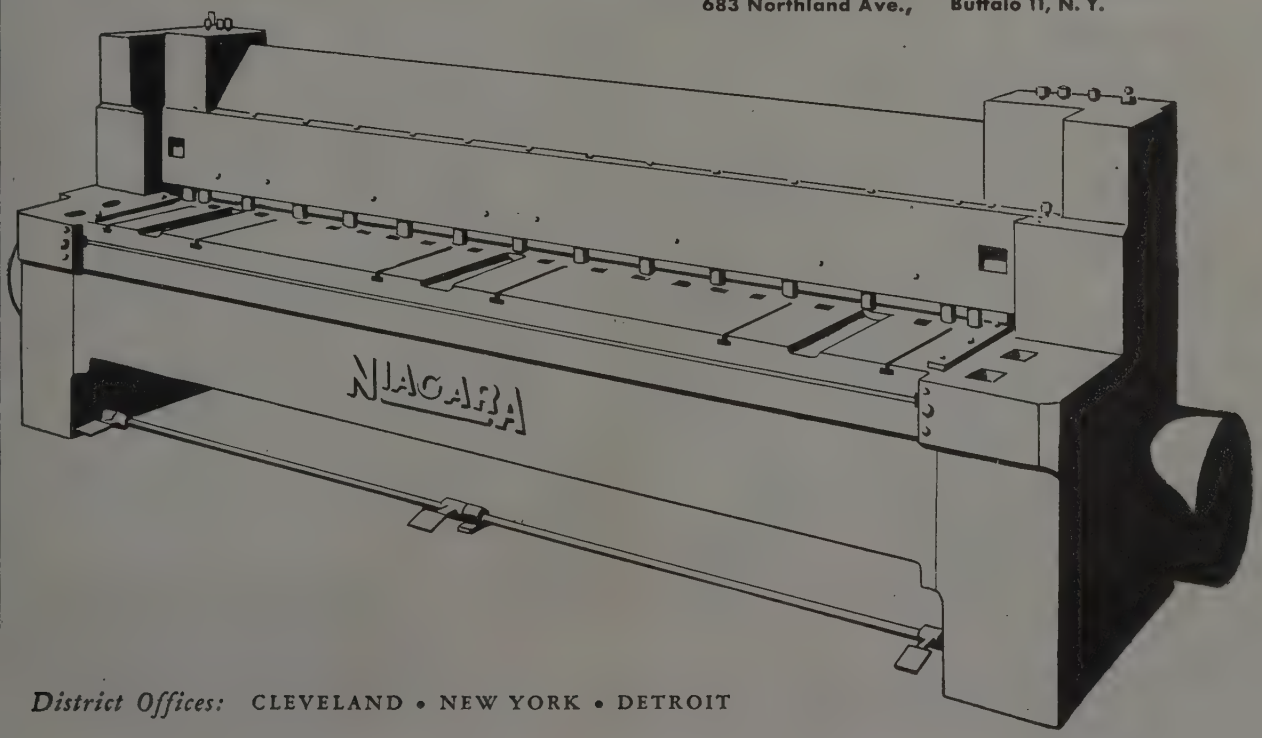
Great Names in America's Progress

● The name George Westinghouse is an honored name not only in industry but in many industries. First prominent through the invention of the air brake, the name and genius of Westinghouse is associated with hundreds of other products known for utility, performance and service to people everywhere. Niagara presses, shears and other machines for working sheet metal are important in the production of an infinite number of products bearing the Westinghouse name. Men responsible for production economy are invited to look into the advanced design of Niagara machines.

NIAGARA

MACHINE AND TOOL WORKS

683 Northland Ave., Buffalo 11, N. Y.



District Offices: CLEVELAND • NEW YORK • DETROIT

Five 7½-kw and two 15-kw Lepel Spark-gap Converters at work at Ranger Aircraft. Inset shows 9 of the 11 brazes.

Each of these assemblies, made by The Ranger Aircraft Engines Division, involves 11 brazes, 4 hardening operations and the annealing of a cyanide-hardened shaft. By use of ingenious fixtures, and careful matching of heating cycles, assembly times and machine capacity, Ranger completes 320 assemblies in an 8-hour day — with just eight operators and seven Lepel High-frequency Heating Units.

Most of the steel-to-steel brazes are handled in pairs, with heating cycles ranging from 10 to 60 seconds. Jigs and snap-closing spring clamps position the accurately cut tubing; silver-alloy rings provide the brazing metal.

Heat treating with same units provides flexibility. Where 320 brazes can be completed in less than 8 hours, converters and fixtures are changed over to annealing or hardening in a matter of minutes. The annealing is done at a rate of 240 parts per hour; hardening, with water quenching, at rates up to 333 per hour.

This installation was worked out by Ranger's production men in co-ordination with Lepel engineers. In flexibility, speed, quality and excellent working conditions, it has turned a difficult assignment into a routine production job.

SOLDERING
BRAZING
HARDENING
ANNEALING
MELTING

The same Lepel Spark-gap Converter will handle any or all of these processes, usually with advantages similar to those given in this advertisement. Often this unit will prove substantially more economical than any other high-frequency generator—*particularly when heating non-ferrous or non-magnetic materials.* Changing from one job to another can be done in less than 5 minutes.

If you have any operation — on ferrous or non-ferrous materials — which you think might be handled by high-frequency heating, let us make a quick preliminary investigation. If promising, our engineers can run tests, on samples you supply, and report just what can be done. There is no obligation; inquiries are treated with strictest confidence.

A letter to us will bring you, as you prefer, our latest catalog or a call by a representative. Any description of part or process which you can give may enable us to furnish, immediately, specific helpful data. You can help us by mentioning this advertisement.

HARDEN

SOLDER

BRAZE

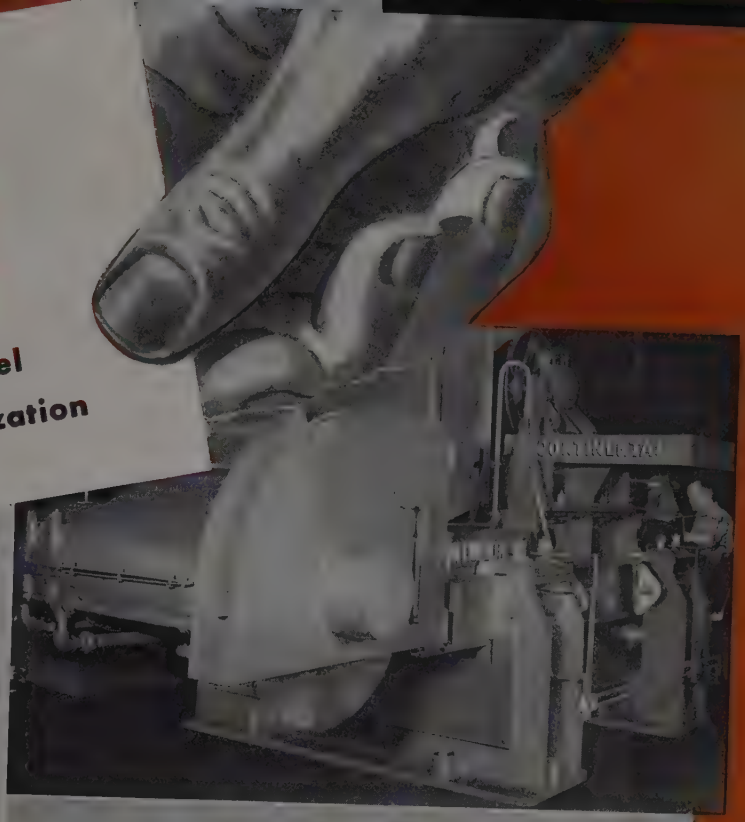
MELT

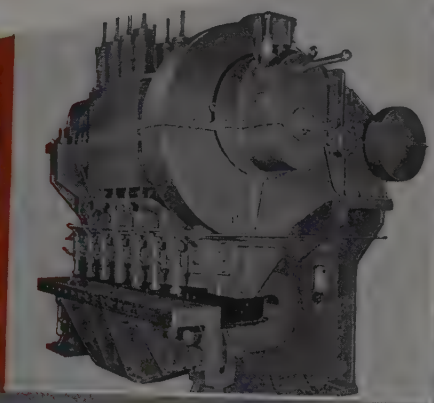
LEPEL HIGH FREQUENCY LABORATORIES
39 WEST 60th STREET, NEW YORK 23, N. Y.

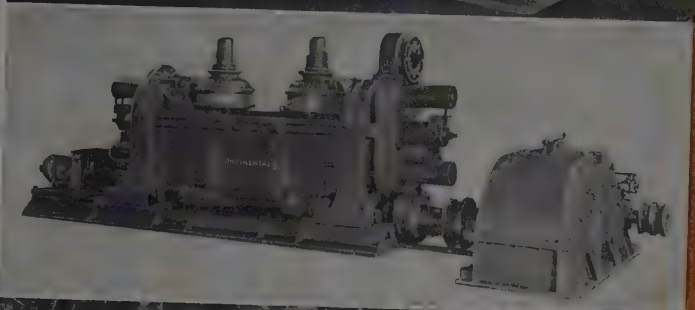
A Specialty!

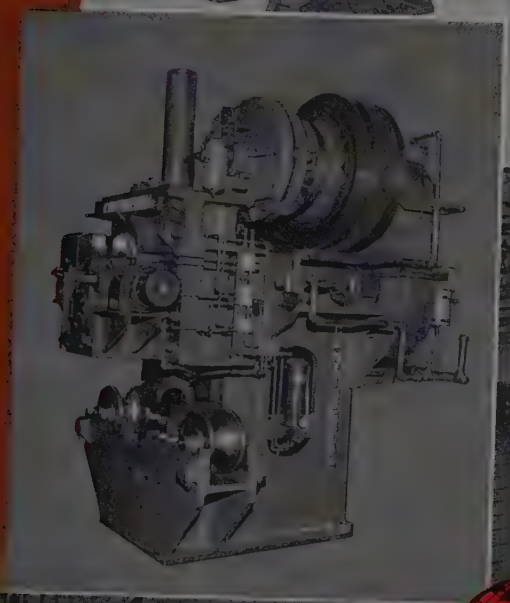
STEEL PLANT EQUIPMENT

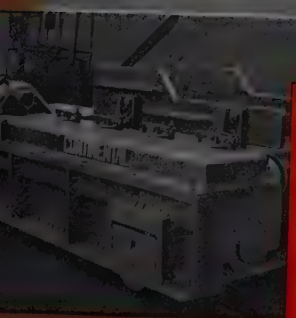
Custom Engineered for Steel Plant Expansion and Modernization











Continental

Continental

FOUNDRY & MACHINE CO.

CHICAGO • PITTSBURGH

Plants at East Chicago, Ind. · Wheeling, W. Va. · Pittsburgh, Pa.

Industry's Headquarters for
Carbon and Alloy Steel Castings
Rolling Mills and Equipment
Iron and Steel Rolls

Never too big or too complex . . .

Continental

for dependable, uniform

CASTINGS

to specifications

Cutter Head for Hydraulic Dredge

CONTINENTAL is headquarters for finest precision carbon and alloy steel castings of all types from 50 lb. production designs up to complex special castings weighing as much as 250,000 lbs. CONTINENTAL'S unexcelled facilities offer you the complete answer to all your casting requirements.

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Plants at: E. CHICAGO, IND. • WHEELING, W. VA.
PITTSBURGH, PENNA.

"SUPEREX sure stands up!

...You can take my word for it. I've used it behind refractory linings for over 20 years!"

SO SAY steel men everywhere. Oil men, too—in fact, practically everyone who handles high temperature equipment. You can't beat Superex as a block insulation for temperatures up to 1900 F. That's why it's behind more refractory linings than any other block type insulation.

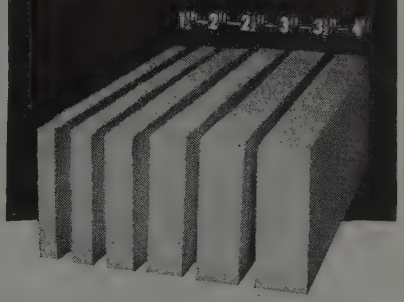
These seven reasons give the Superex story in a nutshell:

1. **Low Thermal Conductivity**—Superex is made from specially selected calcined diatomaceous silica, bonded with asbestos fibre—presenting a formidable barrier to the passage of heat.
2. **High Heat Resistance**—J-M Superex Blocks safely withstand temperatures up to 1900 F. without deterioration.
3. **Lightweight**—Approximately 24 lbs. per cu. ft.
4. **High Physical Strength**—Withstands vibration and other physical abuse encountered in normal service. Approximately five tons pressure per square foot are required to compress Superex ⅛ inch.
5. **Permanent Efficiency**—Superex maintains high thermal efficiency indefinitely—will not disintegrate in service for which recommended.
6. **Quick Application**—The convenient sizes and lightweight of Superex assure fast, economical installations.
7. **Easy Cutting and Fitting**—Superex is easily cut with an ordinary knife or saw for fitting around openings or irregular surfaces.

Special shapes and curved blocks—in addition to the 6 standard thicknesses illustrated—can be supplied. Write Johns-Manville, Box 290, New York 16, N.Y.

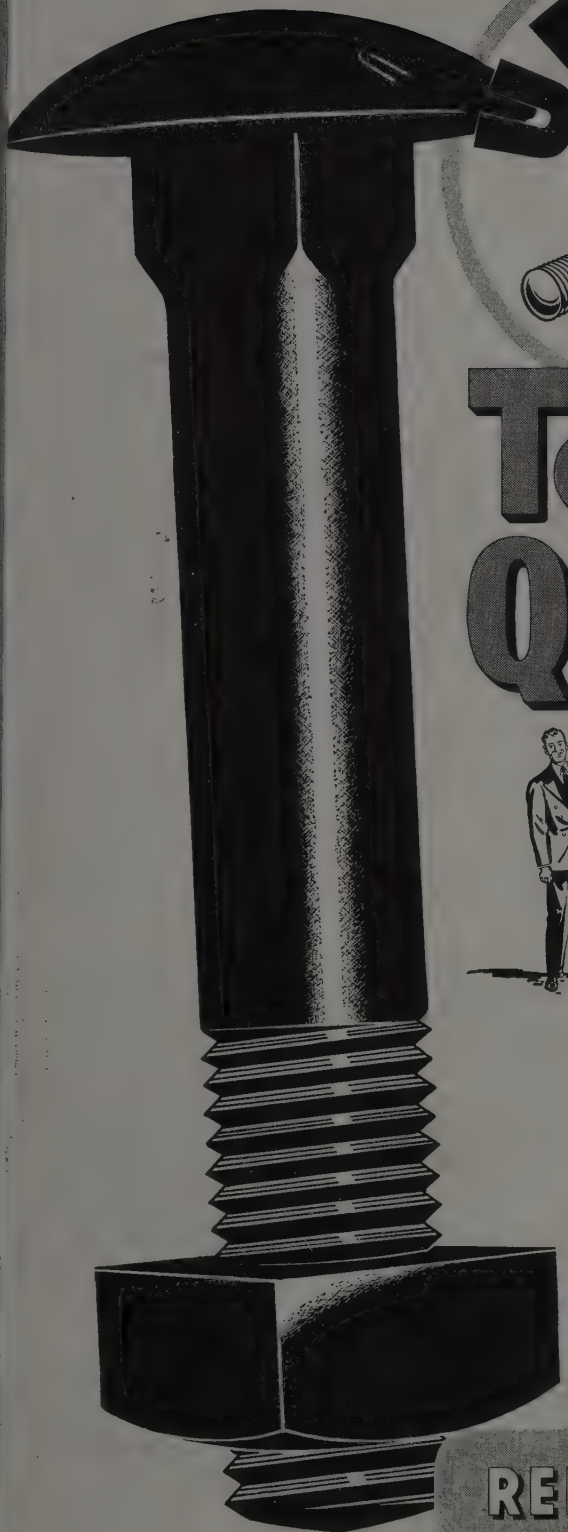
JOHNS-MANVILLE JM PRODUCTS

Superex blocks are finished in various standard sizes and thicknesses.



JOHNS-MANVILLE *First in* INSULATIONS

VICTOR
IT COSTS LESS TO OWN AND OPERATE
VICTOR EQUIPMENT COMPANY
SAN FRANCISCO, LOS ANGELES · CALIFORNIA



UPSON

Top Quality

MEANS SMOOTH, FAST ASSEMBLY

...plus lasting holding power, too, wherever Republic UPSON Quality Headed and Threaded Products are used. Throughout more than 20,000 different sizes and shapes, UPSON Quality means Top Quality—from strong, full-formed heads to clean, accurate threads—and backed by 93 years of bolt-making experience.

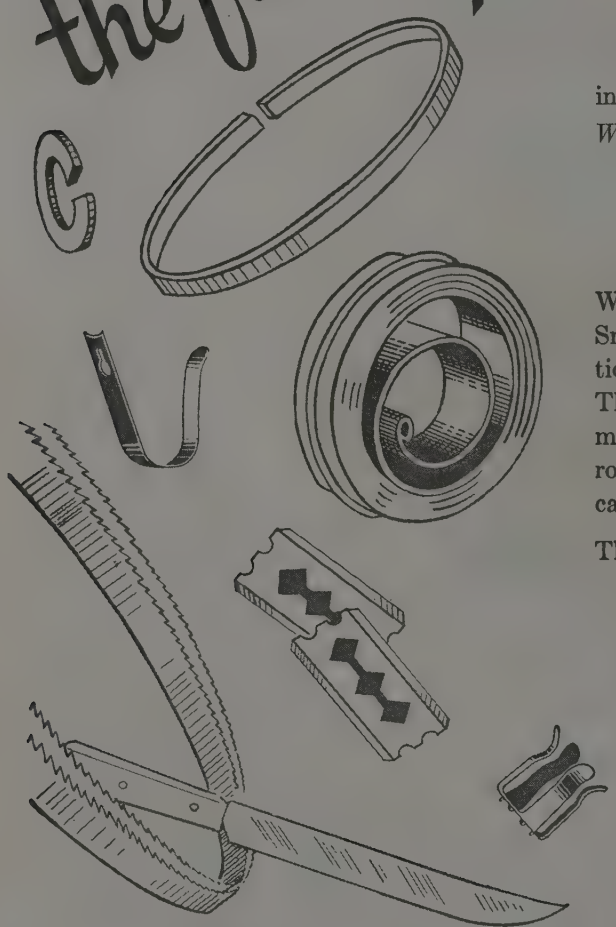
REPUBLIC STEEL CORPORATION
BOLT AND NUT DIVISION • CLEVELAND 13, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC *Upson Quality* BOLTS AND NUTS

Other Republic Products include Pipe, Sheets, Tubing, Hot Rolled and Cold Drawn Bars—Carbon, Alloy and Enduro Stainless Steels

The Better the Steel . . .

the finer your product

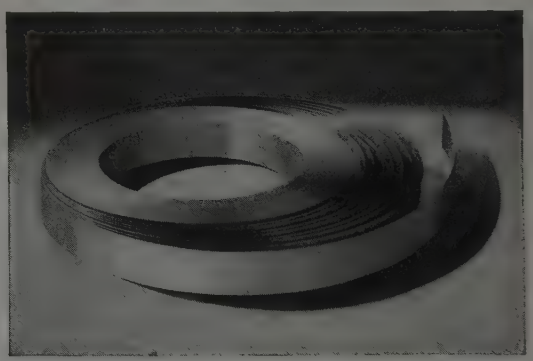


Huge scale production has started in many plants—insure the excellence of YOUR product by using *Washburn Top Quality Premium Steel.*

WASHBURN PREMIUM STEEL WILL MEET YOUR MOST EXACTING NEEDS!

Washburn quality begins in OUR OWN STEEL MILL. Small heats, cast in small ingots, mean closer production control . . . and assure clean uniform billets. These billets are fabricated . . . by up-to-the-minute methods . . . into strip—rectangular, round, and flat rods—tempered and untempered flat and round high carbon wires.

The success of your product depends on quality Washburn Wire and Strip ASSURE quality.



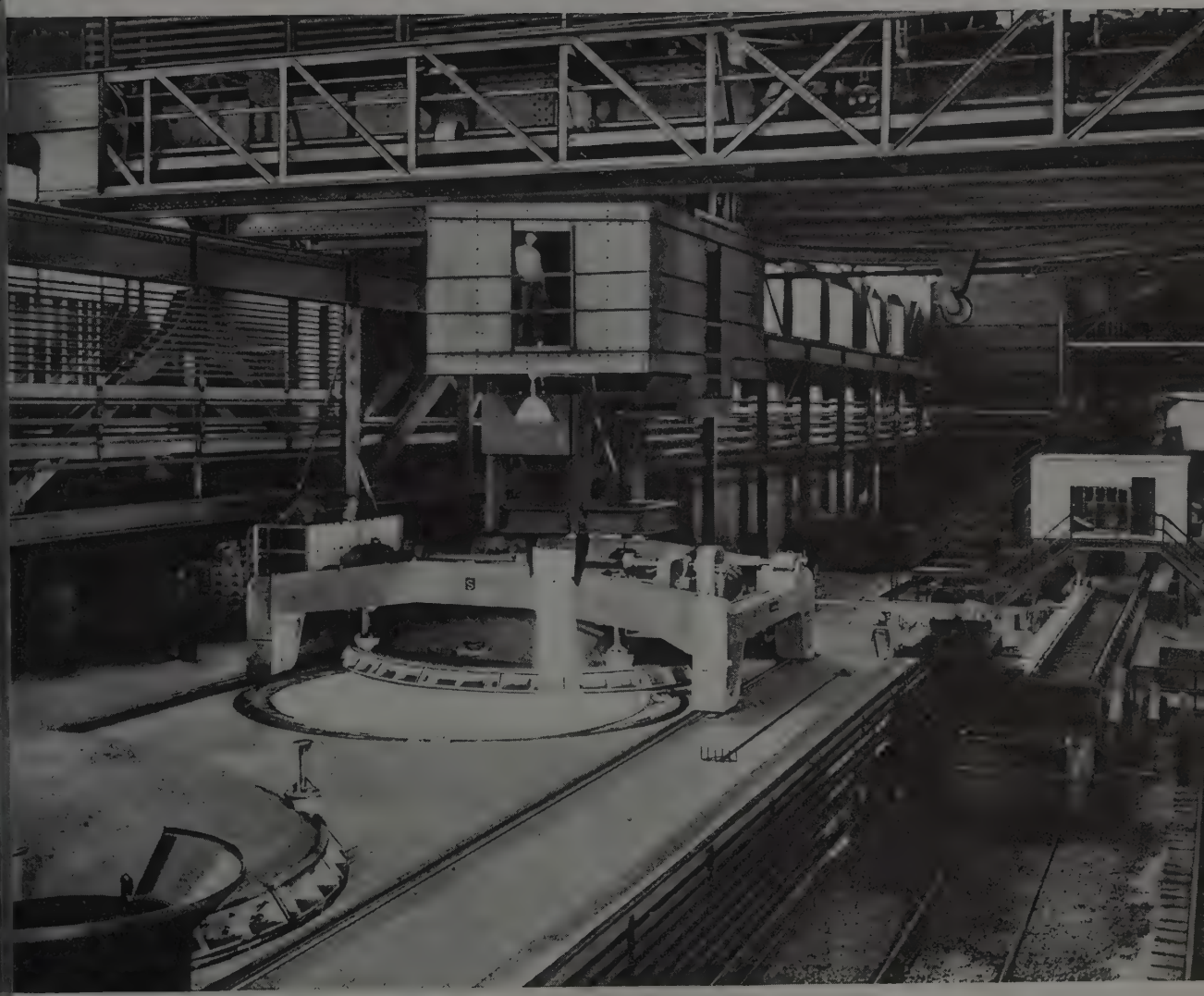
Specify WASHBURN Premium Steel

WASHBURN WIRE COMPANY • NEW YORK, N. Y.

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

BUILT BY MORGAN Engineering

MORGAN 7½-TON, 81′3″ SPAN SOAKING PIT CRANE



Illustrated is a Morgan 7½-Ton, 6-Motor, 81′3″ Span, Stiff Leg Type Soaking Pit Crane. It serves a Morgan 36″ Two-High Blooming Mill which was furnished complete with auxiliary equipment. It is equipped with fabricated welded trolley and bridge trucks. Morgan Pit Cranes are provided with spur or worm gear operated trolleys and sleeve or anti-friction bearings as required.

THE MORGAN ENGINEERING CO.

ALLIANCE, OHIO. 1420 Oliver Building, Pittsburgh

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

Reduce, by eight hours, the time required for a vital railroad maintenance operation—that's real progress in railroad shop practice.

Improve results and decrease costs—they're important considerations in maintenance and service shops in any industry.

Double production by utilizing the automatic controllability of GAS—that's sure to interest operating executives.

These were the gratifying results cited by the Great Northern Railway in St. Paul, Minnesota, when referring to their Gas-fired coil and armature oven.

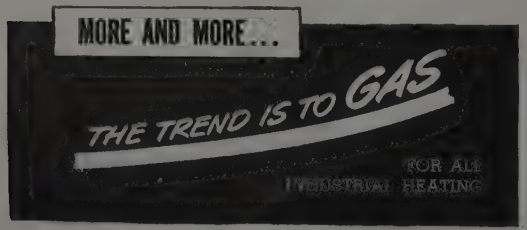
Generators and motors, up to 3-tons each, are baked for varying periods at precise temperatures to dry them thoroughly following routine service cleansing, vacuum impregnation and varnishing. Automatic GAS controls permit two complete baking cycles daily in place of one cycle prior to the installation of Gas-fired Equipment, resulting in greatly increased shop capacity in the same space.

The advantages of GAS and modern Gas Equipment for industrial heat processing have been proved in thousands of manufacturing plants. Your local Gas Company's Industrial Representative will describe the ways in which GAS can serve you.

Great Northern Shops at St. Paul, Minn.

Gas-fired coil and armature oven in the electrical shops of Great Northern Railway.

Gas-fired Oven installed by Despatch Oven Co., Minneapolis, Minn.



AMERICAN GAS ASSOCIATION

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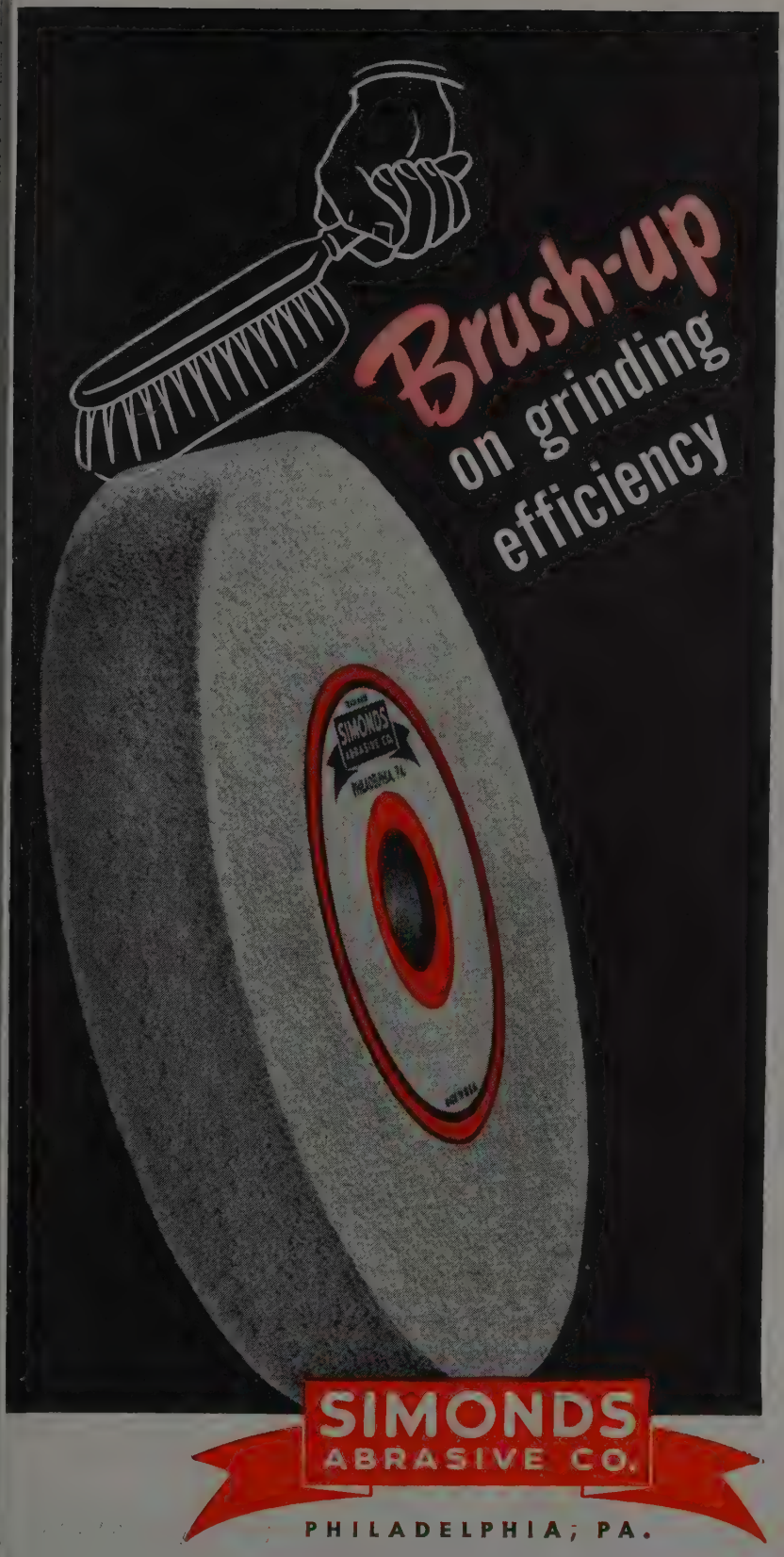

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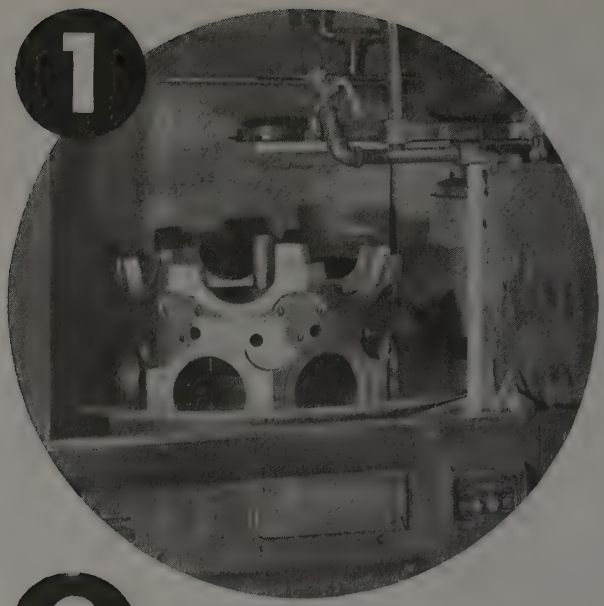

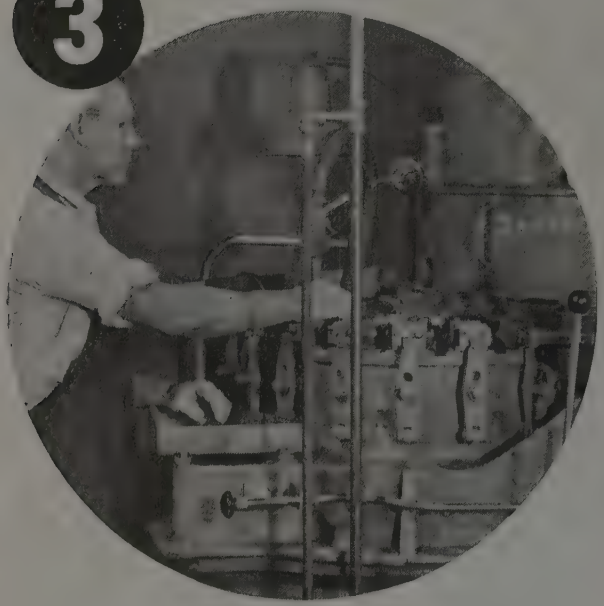

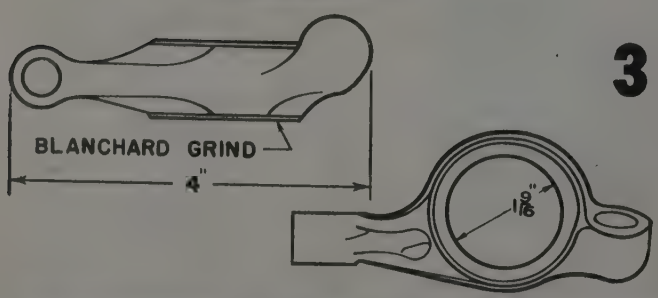

Here are three illustrative examples of the use of Blanchard Grinding in the aircraft engine industry... to produce a quality product, in quantity, at the *lowest cost-per-piece.*

1 Aluminum CRANK CASE SECTION: Ground on a No. 18 Blanchard Surface Grinder. Finish ground on one side—leaving the surface parallel to the bottom and so flat that no lapping is required for a metal-to-metal pressure-tight joint.

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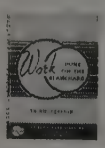

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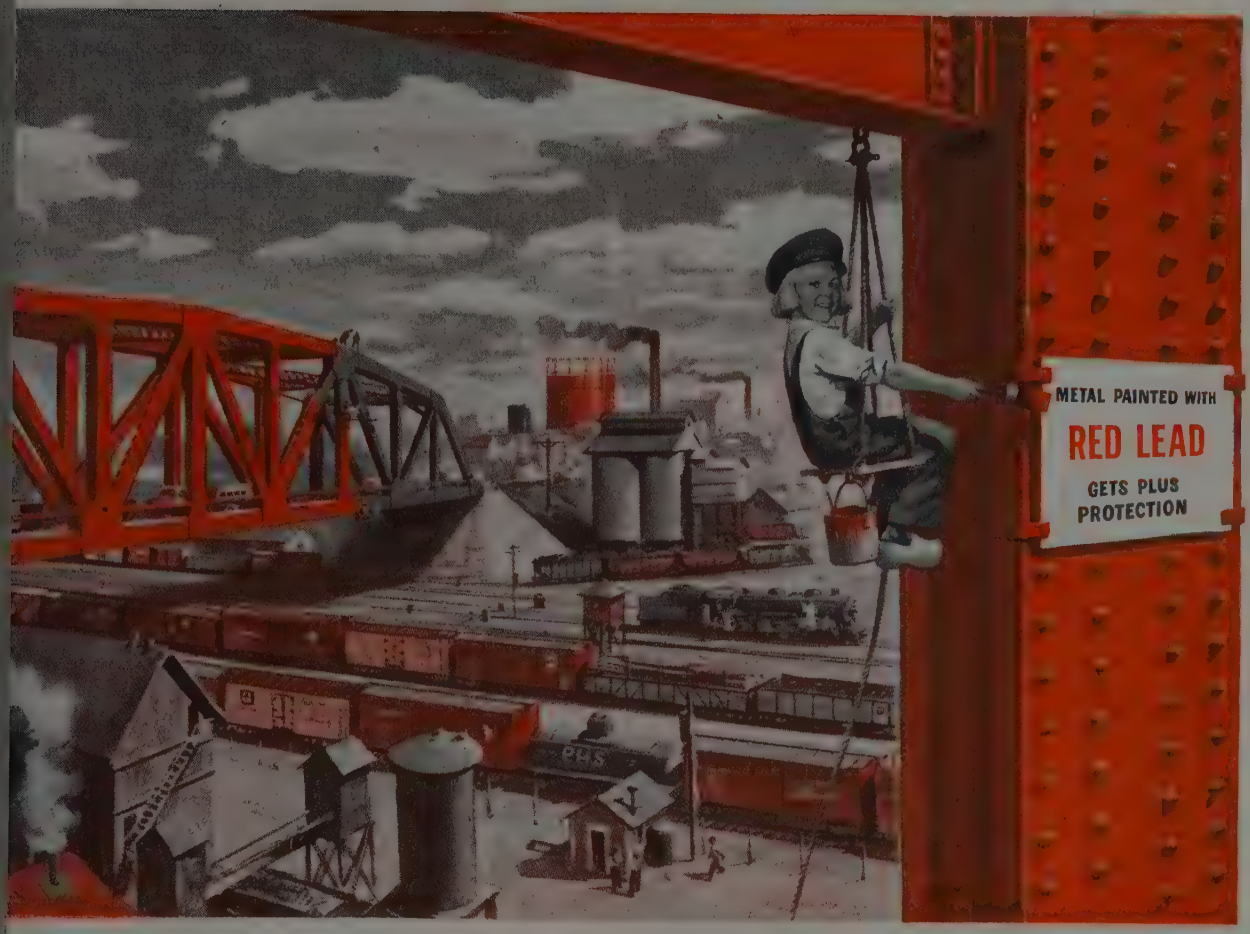

How RED LEAD stops Electro-chemical Action ...basic cause of Rusting

Modern science reveals many reasons *why* Red Lead has earned its place as the "standard" metal protective paint.

One very basic factor is Red Lead's ability to halt electro-chemical activity—the fundamental cause of rusting.

In this electro-chemical action, weak currents are generated, because of chemical and physical differences in the metal, as well as local differences in environment. As a result, the iron goes into solution and rusting is promoted.

These electro-chemical conditions are always present; but Red Lead eliminates their harmful effects.

Here's how: Red Lead possesses unique properties which enable it rapidly to convert the iron solubles into stable compounds. This forms a tightly adherent, protective film located at the interface of the metal and the Red Lead coating (see diagram).

This film, so thin it cannot be seen by the eye, is in direct contact with the metal. It effectively inhibits electro-chemical action, and the consequent corrosion of the metal.

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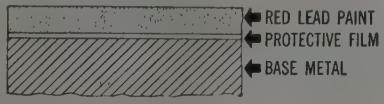
Thus, the metal remains in a rust-inhibited condition as long as Red Lead coats the surface.



The Film that halts corrosion: *This diagram shows the protective shield, located at the interface of the metal and paint film. The formation and continuous maintenance of this film by Red Lead stops electro-chemical action... inhibits the metal from rusting.*

* * *

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including many of the fast-drying resin types.

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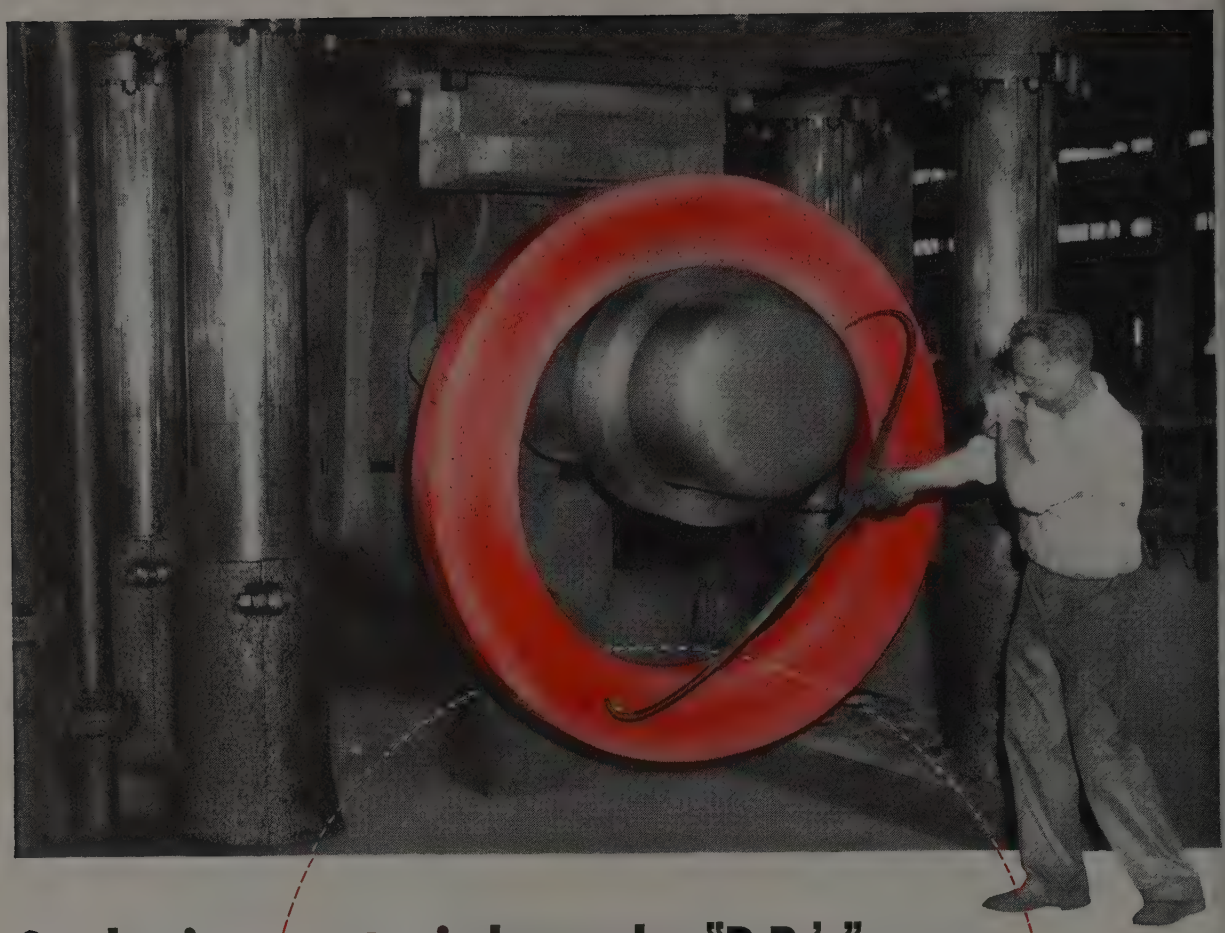
DUTCH BOY
RED LEAD



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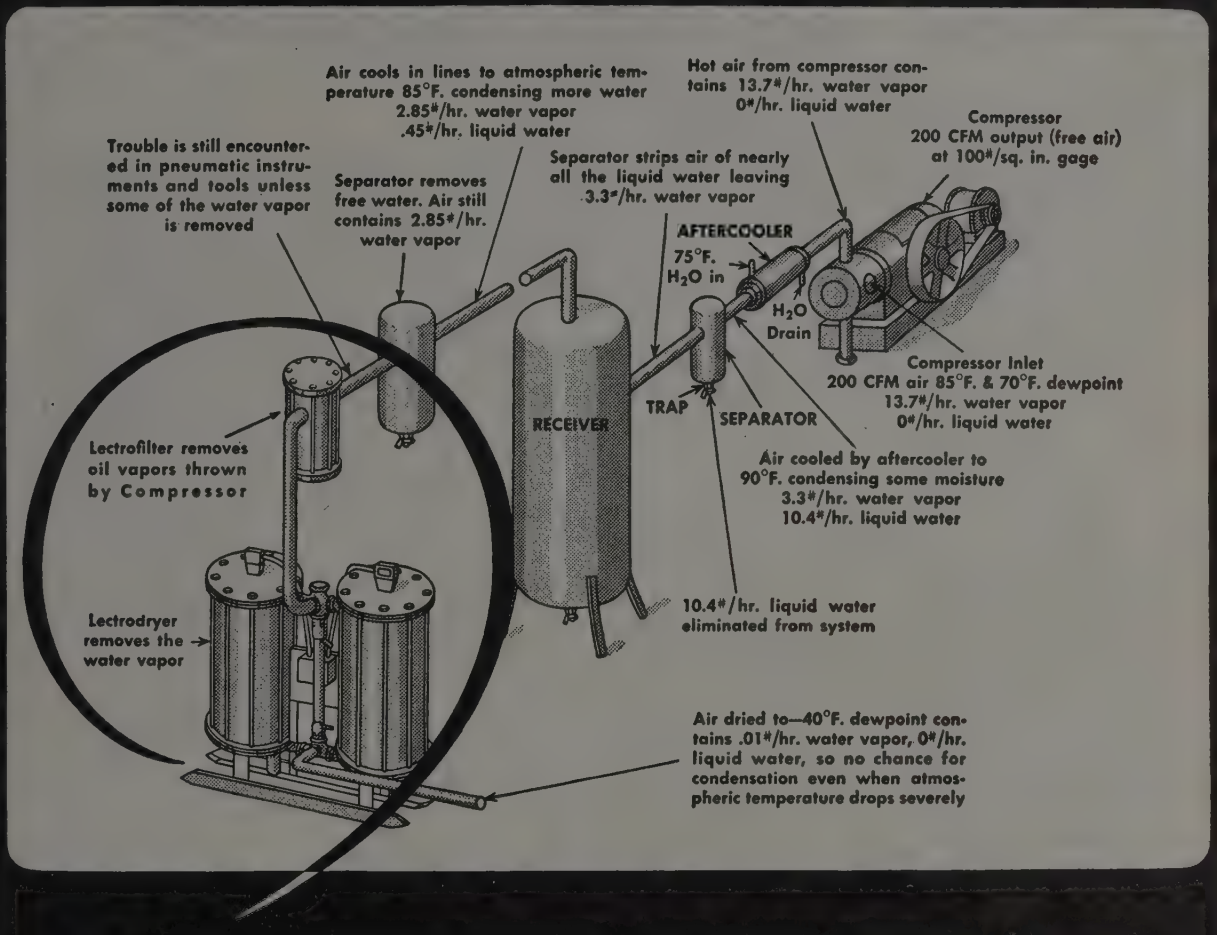
IF COMPRESSED AIR IS A TROUBLEMAKER


Air cools in lines to atmospheric temperature 85°F. condensing more water 2.85#/hr. water vapor .45#/hr. liquid water
Hot air from compressor contains 13.7#/hr. water vapor 0#/hr. liquid water
Compressor 200 CFM output (free air) at 100#/sq. in. gage
Trouble is still encountered in pneumatic instruments and tools unless some of the water vapor is removed
Separator removes free water. Air still contains 2.85#/hr. water vapor
Separator strips air of nearly all the liquid water leaving .3.3#/hr. water vapor
AFTERCOOLER
75°F.
H_2O in
H_2O Drain
Compressor Inlet 200 CFM air 85°F. & 70°F. dewpoint 13.7#/hr. water vapor 0#/hr. liquid water
RECEIVER
TRAP
SEPARATOR
Lectrofilter removes oil vapors thrown by Compressor
Air cooled by aftercooler to 90°F. condensing some moisture 3.3#/hr. water vapor 10.4#/hr. liquid water
Lectrodryer removes the water vapor
10.4#/hr. liquid water eliminated from system
Air dried to—40°F. dewpoint contains .01#/hr. water vapor, 0#/hr. liquid water, so no chance for condensation even when atmospheric temperature drops severely

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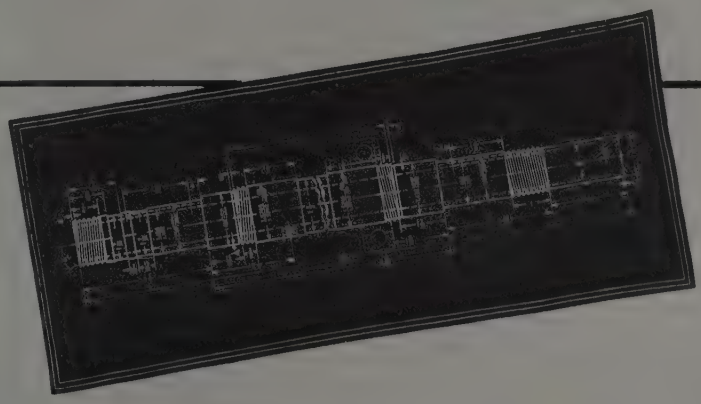
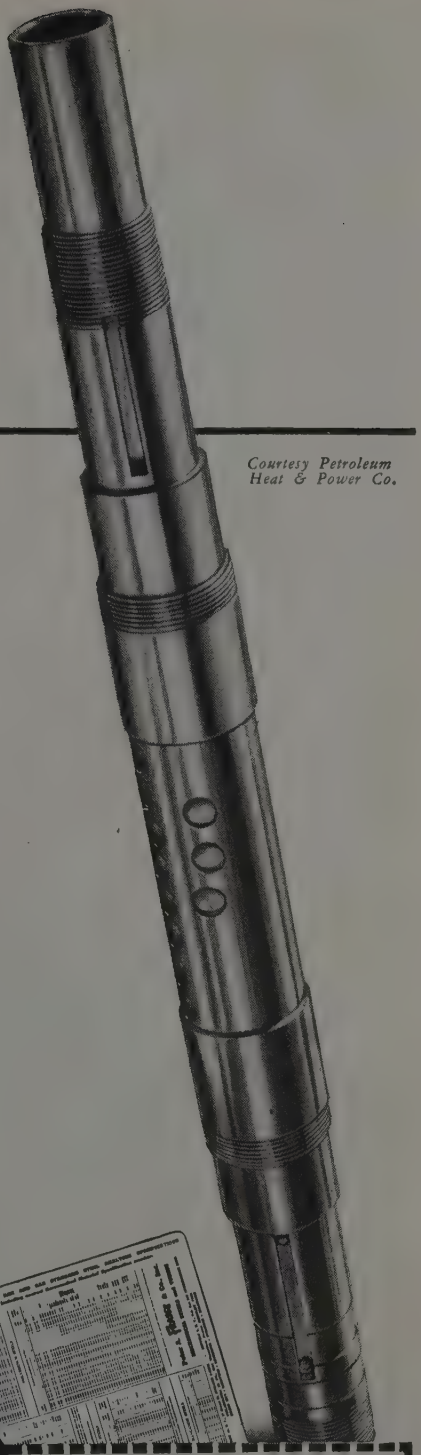
The Steel Tube "Headache" that Multiplies Itself





Courtesy Petroleum Heat & Power Co.

TO MAKE this "Petro" oil burner shaft, a seamless steel tube is turned and ground to 17 separate diameters. It's threaded, tapped, chamfered and keywayed—all to close tolerances.

The cost of making this finely balanced shaft (8 times that of the raw material) makes rejection of a finished part highly expensive. Hours of skilled labor might be spent on material later found defective—while the cost headache multiplies with every wasted man hour.

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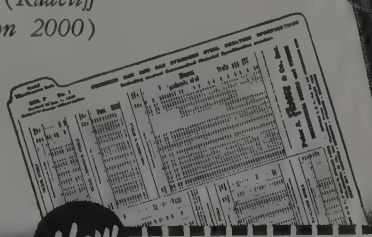

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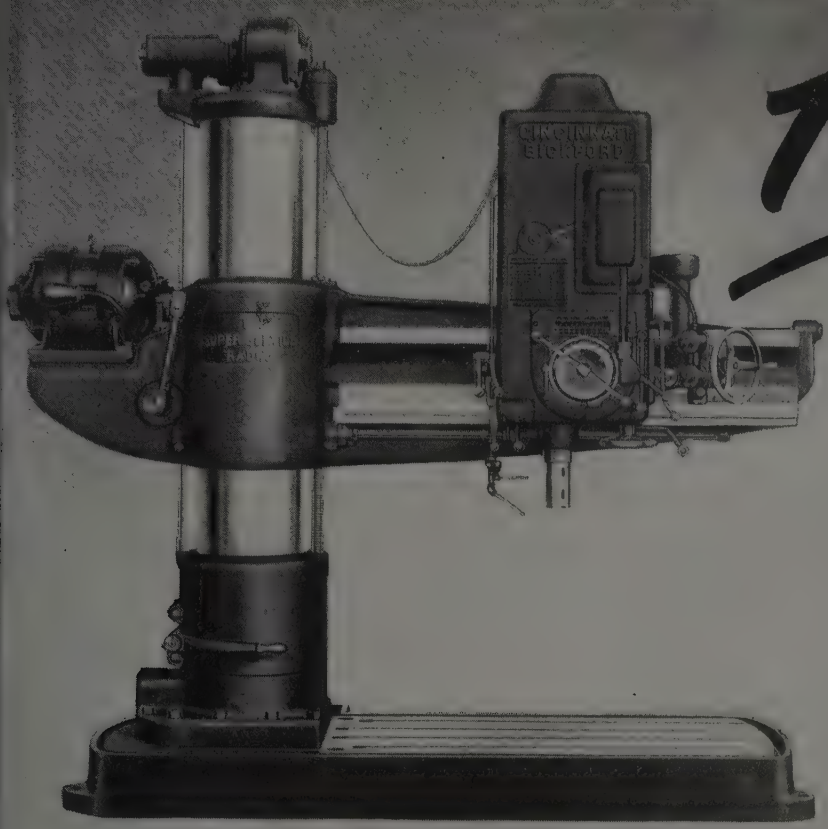
For PRODUCTION they are tops



These powerful Cincinnati Bickford Super Service Radial Drills handle easily, and operator has complete control through levers placed low on the head. Eighteen feeds and 36 speeds insure the right feeds and speeds for the job.

Write for a complete description of the production, safety and special design features of these machines in Bulletin R-24-A.

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- Automatic oiling.
- Multiple splined integral keyed shafts throughout.
- Sliding gear feed changes.

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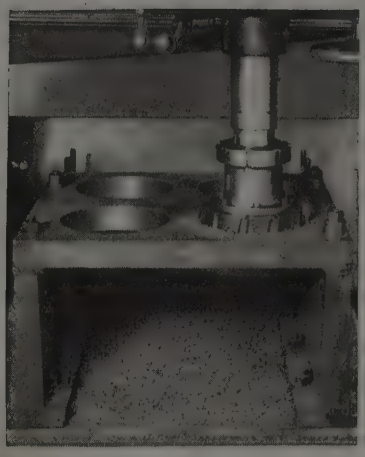
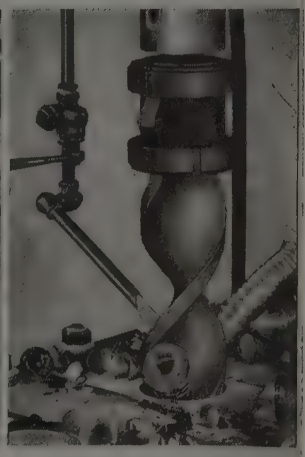


Long spindle sleeve bearing for accuracy—10½" boring tool in 9¾" cored hole—.042 feed. No pilot bar is used.



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Film Aids in Corrosion Control
Chrome-Nickel Welded Caskets
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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 21 MAY 26, 1947

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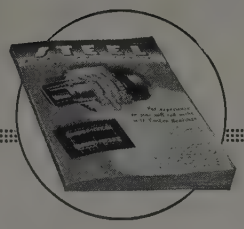


May 26, 1947

Tell of Opportunity!

One of the choice bits of current Americana is the embarrassment to which Secretary Marshall and his State Department are subjected in connection with their propaganda activities. The department publishes a de luxe magazine, conducts radio programs and engages in other activities intended to impress the people of other nations—particularly those of Russia—with the advantages of the American way of life. Congress has been balking at appropriating money for the continuance of some of these activities.

This reluctance to give the State Department the money requested is not due to any special zeal for economy nor does it mean that congressmen are opposed to propaganda. Congress is sour on the appropriation because it doubts from past experience whether the department knows how to get over to the rest of the world the American story accurately and effectively. It has seen the "circus lady" example of American art and it has read a few horrible samples of the department's idea of Americanism. It wants no more of this bungling.

The conflict between the department's propagandists and congressmen raises the pertinent question as to just what is the best way to sell the American way to the rest of the world.

We fear that the State Department to date has suffered from super-professionalism. It has been exploiting art and literature which is subject to controversy. Its propagandists are too clever.

A better way to sell America is to tell the world in the simplest language possible the story of opportunity possessed by its citizens. Explain how a rail-splitter, Abraham Lincoln, could become president; how Henry Ford, an obscure mechanic, could build an industrial empire that changed the economy of the world; and how Thomas A. Edison, a news butcher, and Charles Steinmetz, an emigrant boy, could rise to heights from which their genius contributed to the benefit of all mankind.

Then tell of the opportunity of the ordinary man—he who lacks the spark of genius but has the solid stuff required to do his part. Tell how he can command a good wage and explain what it will purchase in terms of home, automobile, services, education, recreation and culture. Dwell particularly on the individual freedom and the dignity of citizenship which he enjoys.

This is the kind of true story that will impress the unfortunate people of Europe and Asia who are hesitating between the slavish security of totalitarianism and the free opportunity of democracy.

* * *

LONG STEP FORWARD: In accordance with a pattern that is becoming characteristic of 1947 conventions, major emphasis in the program of the fifty-fifth general meeting of the American Iron & Steel Institute was placed upon the problem of preserving the American system of private enterprise.

Various aspects of this problem were touched upon by President Walter S. Tower in his scholarly analysis of the present state of the steel industry, and by Charles E. Wilson, president of General Electric Co., in his forceful address on "Economic Control and Political Freedom."

The remarks of these speakers provided an appropriate introduction for the discussion by Edward L. Ryerson, chairman of Inland Steel Co., on the steel industry's public relations program. Mr. Ryerson outlined a four-part plan by which the institute will attempt to educate the public into a better understanding of the industry and of what it means to the welfare of the nation. The institute plan will parallel and augment the public relations work of individual companies.

It is to the credit of the steel industry that the

(OVER)

program described by Mr. Ryerson has been approved, that its cost has been underwritten and that it will be placed in operation immediately. It is a long step in the right direction toward meeting a challenge that confronts not only the steel industry but all industries. —p. 62

* * *

LABOR RETAINS GAINS: Regardless of the ultimate fate of the labor reform legislation —now subject to revision in conference and to later veto or approval by the President—many of the economic and social gains which labor has won during the past 14 years will be retained.

They are incorporated in current labor contracts, many of which are the result of years of refinement. When United States Steel signed a contract with the steelworkers in 1937, the pact was typed on three pages. Its prototype of 1947 required 75 typewritten pages. The agreements between employers and employees in the metalworking industries now are voluminous and cover in great detail many factors that were not even considered a decade ago. In a sense, they constitute a code of labor-management relations which has been evolved by experience.

Labor legislation may change this code in some respects, but it contains many provisions of great value to labor that will endure. —p. 59

* * *

TECHNICAL PROGRESS: Wednesday's afternoon sessions of the general meeting of the American Iron & Steel Institute constituted the most ambitious effort yet made by the institute to set forth in detail the present state of technological progress in the industry.

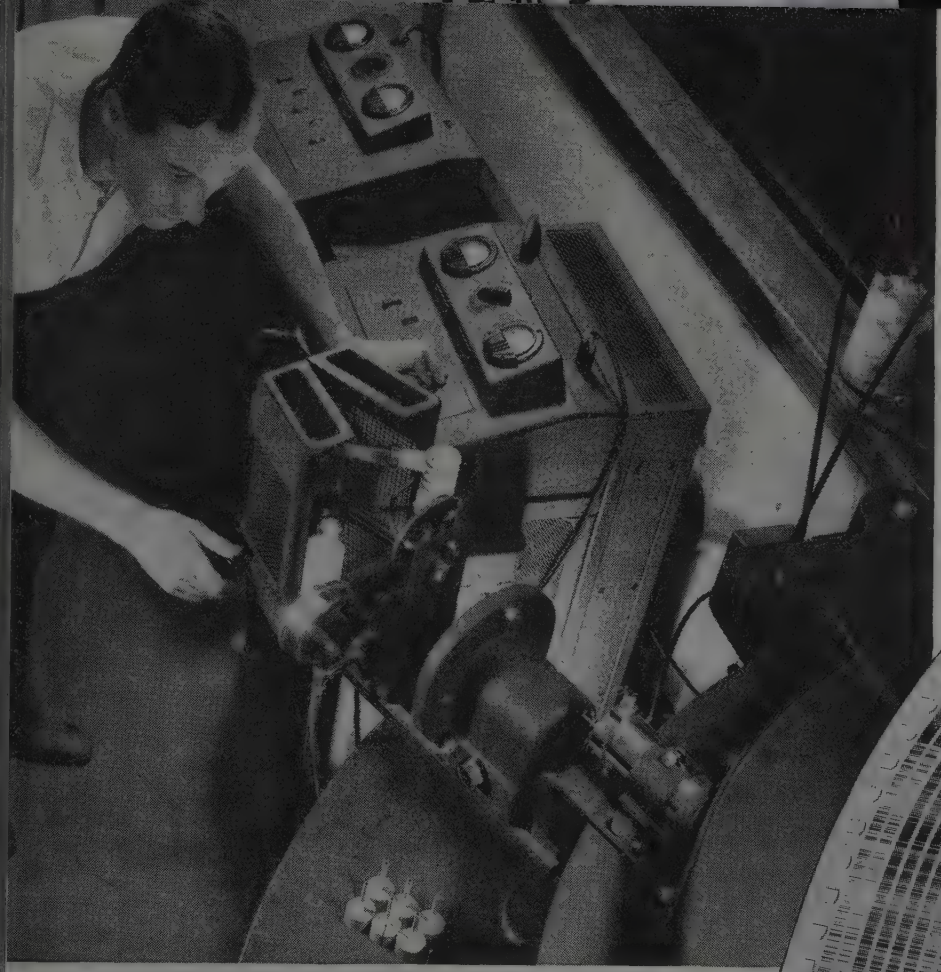
At four simultaneous sessions, 24 technical papers were presented, covering a wide range of topics dealing with coke ovens, blast furnaces and steelmaking furnaces; raw materials; shaping and forming; and general metallurgy. It is certain that at no previous meeting of the institute have the technical activities of the steel industry been presented as completely or as competently as in this instance.

Hundreds of institute members who attended these sessions came away with a new appreciation of the high quality of expert attention that is being devoted to the technical problems of the steel industry. Likewise they gained confidence in their realization of what this activity will mean to the progress of the industry in the future. —p. 114

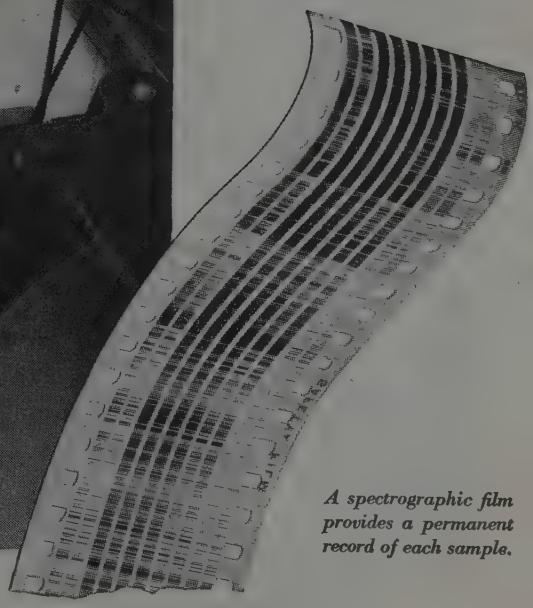
SIGNS OF THE TIMES: All advance signs indicate that the 1947 Machine Tool Show to be held in Chicago in September by the National Machine Tool Builders' Association will be double the size of the last show held in Cleveland in 1935. More than 250 exhibitors will demonstrate more than 1000 machine tools and related equipment (pp. 66, 75) in booths occupying 500,000 sq ft of floor space. An attendance of 100,000 is anticipated. . . . Testimony heard by the Senate Judiciary Antimonopoly Subcommittee in connection with the Federal Trade Commission's charge that recent acquisition by steel producers of steel drum manufacturing plants constitute "horrible examples" to prove that loopholes in the antitrust laws must be plugged (p. 60) did not convince the senators that FTC has a sound case. . . . The petroleum industry fears it will be squeezed between an increasing demand for its products and a scarcity of steel. Higher prices for crude have stimulated the drilling of new wells which, with an active demand for steel for oil operations abroad (p. 72), may cause a domestic shortage of oil country steel products. . . . Concluding a two-part article on coolants (p. 94) the author suggests suitable selections of coolants for metal cutting, sawing, grinding, rolling, drawing, stamping and forming. . . Ford Motor Co. River Rouge employment office hired 1756 persons out of 5410 applicants in April, 2189 out of 6816 in March and 2666 out of 7946 in February (p. 76), indicating a surprising consistency in employing about one out of every three job seekers. . . . . That part of the German steel industry in the British and American zones of occupation is undergoing a wholesale transformation due to production and financial controls (p. 71) which not only regulate production and distribution but also are breaking up the corporate form of the companies. . . . General Motors' policy committee has decided to "postpone indefinitely" the projected Chevrolet light car project in Cleveland. This decision, which was caused by a combination of unfavorable factors (p. 75), has drastic repercussions because orders for materials, equipment and machinery had been placed. . . . Small manufacturers, testifying before a subcommittee of the Senate Committee on Small Business (p. 73), cited instances where their customers purchased steel in the "gray" market and furnished it to the manufacturers in order that the latter could fill urgent orders.

E. L. Shaner

EDITOR-IN-CHIEF



Examination of the spectrum emanating from the vaporization of the steel sample in an electric arc quickly reveals the chemical content of the sample.



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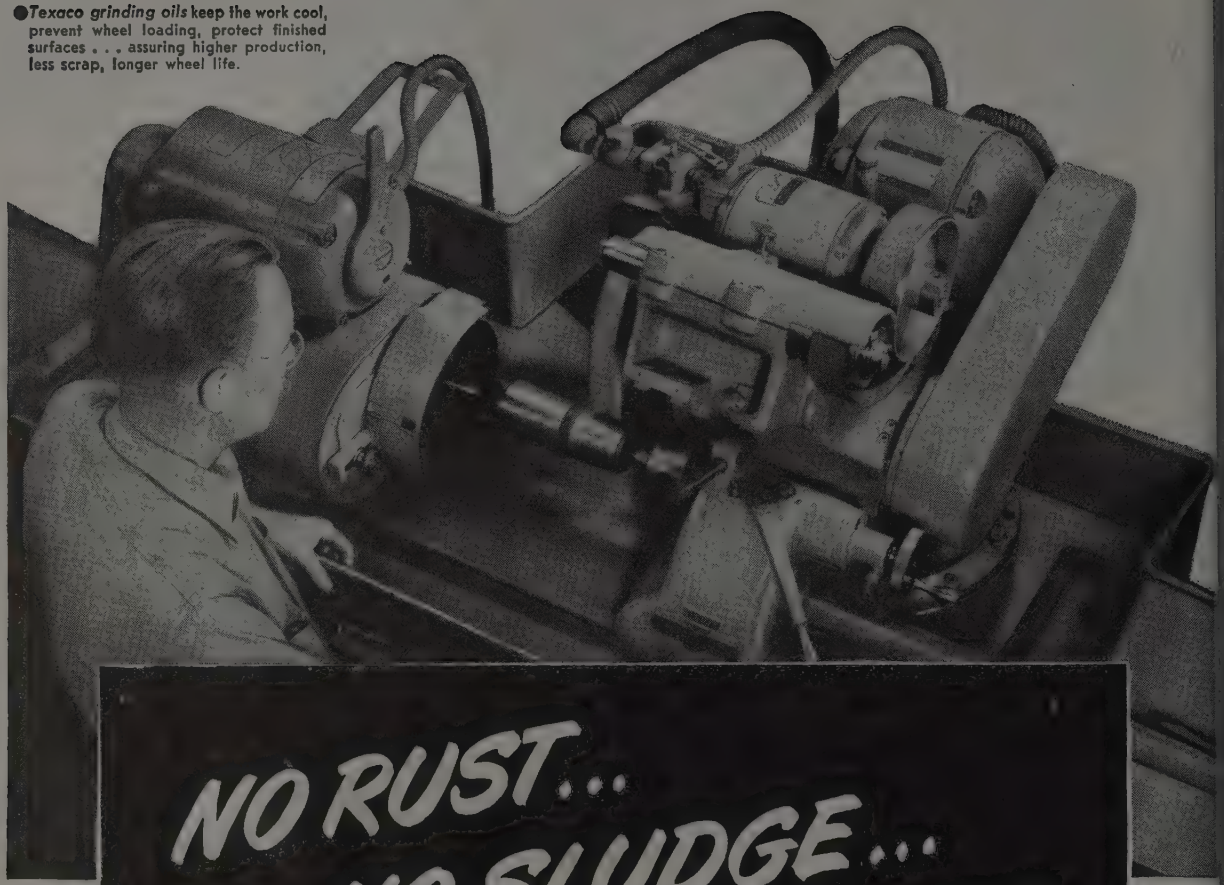

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House and Senate conferees of labor legislation near compromise on difference in labor bills. Left to right, seated: Senator Murray, Senator Ellender, Representative Hartley, Senator Taft and Senator Ives. Standing: Senator Ball, Representatives Barden, Lesinski, Hoffman and Landis. NEA photo

Fate of Labor Reform Bill Uncertain

Era of labor license, dating from NIRA, seen ended as pendulum swings toward right. Workers will retain social and economic gains, now incorporated in voluminous contracts, virtually constituting labor-management relations code

WITHIN the next few days Congress is scheduled to pass labor reform legislation in compliance with the people's mandate of last November.

Whether the measure will be vetoed by President Truman and, if it is, whether proponents of the legislation can hold the necessary two-thirds majority in each house to override the veto remain uncertain. Both branches have passed labor bills by more than two-thirds majorities —the Senate by 68-24 and the House by 308-107. In conference, the more severe provisions of the House bill were modified to conform closely to those of the more moderate Senate bill, in an effort to draft a measure that either would escape the Presidential veto or could be passed over a veto.

Regardless of the final disposition of the legislation, students of labor-management relations believe that the 14-year era in which labor unions have practically written their own ticket has come to an end. The vote against the administration last fall, the enthusiasm with which Congress has drafted restrictions on union abuses, and the support these measures have won among a large segment of the people, including many union members, indicate the tide of union license has about run its course. The pendulum is swinging the other way.

However, the economic and social gains which labor has made during the past 14 years largely will be retained. Mostly, these gains are incorporated in voluminous labor contracts, which spell out in considerable detail the rights of the workers, and which form what now approaches a code of labor-management relations. Although there may be some crumbling at the edges of this structure and some cementing of loose parts, the labor contracts of the mass production industries probably will continue to form the foundation for labor-industry relations for some years to come.

An appreciation of how substantial labor's gains have been and the extent to which they have been codified in wage contracts may be obtained by a brief review of major labor developments since 1933.

In that year, organized labor was at the lowest ebb since World War I. Total membership in unions was less than 3 million. Bargaining on an industry-wide basis was practically unknown. Union security was recognized in only a few industries. Wages were low and many of the benefits which workers today accept as their due—such as paid vacations, overtime rates, reporting allowances, job security—were in effect only in a few plants.

The National Industrial Recovery Act

of June, 1933, through its section 7a, put new life in the union movement. This section provided for collective bargaining, required wage increases and afforded other privileges to the unions.

In 1935 came the National Labor Relations (Wagner) Act and the National Labor Relations Board. The act was designed to strengthen the position of labor and the appointment of a strongly prolabor NLRB, backed by an equally prolabor administration, resulted in interpretations and rulings in favor of the unions, particularly the CIO, which practically amounted to license.

The result was that union membership increased from less than 3 million to about 15 million. Wage rates rose steadily and sharply. Common labor rates for steel were 33.7 cents before adoption of the steel code in 1933; today the minimum is $1.09. Union security was won in various forms, first as collective bargaining for members, as exclusive bargaining agent in plants where NLRB elections showed a majority of union members, and finally during the war as maintenance of membership.

Today about 40 per cent of union contracts contain maintenance of membership clauses. More than 25 per cent provide for the closed shop and about 20 per cent provide for the union shop.

A very large proportion of the workers in the hard goods industries are under union contract. Of the unions' total membership, nearly 8 million are in the manufacturing industries.

As labor won new concessions, these were written into its labor contracts. These agreements have expanded steadily until they now approach a detailed code for labor-management relations.

Agreements Virtually Are Code

An outstanding example of how labor agreements have expanded and how they now prescribe in considerable detail the rights of workers and management is found in the contracts of the United States Steel Corp. subsidiaries and the United Steelworkers of America-CIO. U. S. Steel was the first major basic steel producer to recognize the union in 1937 and its contracts since have served as a pattern for the steel industry and to a large extent for other industries.

The 1937 agreement between U. S. Steel and the CIO consisted of a little more than three typewritten pages, with brief sections devoted to recognition, wages, hours of work, vacations, seniority, adjustment of grievance, rights of management, discharges, safety and health, and adjustment of inequities.

During negotiations over the past decade, these sections have been expanded and new ones added. The agreement concluded in April contains about 75

(*Please turn to Page* 165)

GAS STORAGE: National Tube Co., United States Steel subsidiary which supplied most of the steel pipe for the "Big Inch" pipeline, now is making torpedo-like pipe sections for storage of natural gas underground, to be tapped in event of future gas shortages. One of the containers is being moved by crane at company's Christy Park Works, McKeesport, Pa. Each section will store 30,000 cu ft of gas

FTC Attack on Steel Producers' Drum Business Proves Hollow

HOLDING up recent acquisition by steel producers of steel drum manufacturing plants as "horrible examples" to prove that loopholes in the antitrust laws must be plugged in the public interest, Federal Trade Commission spokesmen, testifying last week before the Senate Judiciary Antimonopoly Subcommittee, failed to help their cause appreciably.

The subcommittee is studying the commission's bill, S. 104, introduced by Senator O'Mahoney (Dem., Wyo.), which would enable the FTC to consider acquisition of assets in determining whether a merger is illegal by reason of lessening competition and encouraging monopoly.

As the law now stands, the commission is authorized to act only when the merger is accomplished by stock transfer. There is a double loophole, FTC men say; first, their authority to act to prevent mergers is materially circumscribed and, second, when they do act to block a stock deal, the corporation doing the buying can use the stock to transfer the assets of the selling company and then get itself in the clear by quickly getting rid of the stock.

Several prominent steel men, called to testify about the steel drum deals, received lenient treatment after the chairman, Sen. Homer Ferguson (Rep., Mich.), got the drift of things. Senator Ferguson bluntly critized the FTC men for "bringing in a set of facts that does not aid in trying to determine what kind of a law we ought to pass."

The steel witnesses were: Max D. Howell, vice president and assistant to president, and Roger M. Blough, general solicitor, United States Steel Corp.; Robert E. McMath, vice president, Bethlehem Steel Co.; F. T. Barton, president, and J. T. Ross, attorney, Jones & Laughlin Steel Barrel Co.; and Herbert S. Boring, Portsmouth Steel Corp.

Federal Trade Commission representatives were Dr. John M. Blair, economist, Edward Fischer, attorney, and Walter B. Wooden, assistant general counsel.

The steel drum plant acquisitions that figured in the hearings were: United States Steel Corp.'s purchase of the plants of the Boyle Mfg. Co., Petroleum Iron Works and Bennett Mfg. Co.; Bethlehem Steel Co.'s purchase of stock in the Rheem Mfg. Co. and Atlas Steel Barrel Co.; Republic Steel Corp.'s purchase of the Niles Steel Products Co. and Stevens Metal Products Co.; Jones & Laughlin Steel Corp.'s purchase of steel drum plants of the Standard Oil Co. of New Jersey, Wackman Welded Ware Co. and Draper Co.

On two points there was no argument. It was shown that the acquisitions rep-

resented merely changes in ownership and did not result in any lessening of competition. It was shown there continues keen competition in the steel drum business today. Prodded by Senator Ferguson, Mr. Fischer, FTC attorney, was unwilling to admit there should have been a law to stop such acquisitions.

The examination was of interest chiefly as reflecting certain trends of thought in the Federal Trade Commission. For instance, Dr. Blair at one point spoke of the "tremendous accumulation of capital" in the hands of the United States Steel Corp. The corporation at the end of 1944, he said, had some $630 million in hand—an amount, he went on, sufficient to enable it to buy up 73 per cent of all corporations in the iron and steel industries, including not only the basic iron and steel companies but the foundries, screw machine products plants, stamping plants, cutlery plants and a wide variety of other industries that use iron and steel.

Senator Ferguson replied that just because the steel corporation had $630 million on hand is no proof that it could have bought up anything like 73 per cent of the iron and steel producing and consuming industries. Had it done that it would have had no working capital left; furthermore, it takes a lot of working capital to run an outfit like the steel corporation, said Senator Ferguson. Dr. Blair explained that all he had in mind was to point out that the steel corporation was in a wonderful cash position to acquire going concerns.

Oppose Limits on Enterprise

Senator Ferguson wanted to know whether the Federal Trade Commission would seek to prevent the steel corporation and Bethlehem from going into new lines of business such as the steel barrel business. Dr. Blair and Mr. Fischer replied in the negative when the senator asked them if it was their belief that "we in America should limit corporations to specific businesses and not allow them to branch out," and that "we should keep basic steel producers from manufacturing anything else?"

A controversy developed when Mr. McMath denied that its 30 per cent stock ownership in the Rheem Mfg. Co., gives Bethlehem control over Rheem. The FTC representatives declared they knew of many instances where control is obtained with far less than a 30 per cent holding in a company. Senator Ferguson sided with Mr. McMath by saying he knew of no law by which control is obtained with an ownership of 30 per cent.

Another bad experience for the Federal Trade Commission came as a result of Dr. Blair's introduction of a letter sent in March of this year by Republic Steel Corp.'s Niles Metal Products Division to a wholesaler who had previously sold steel containers by the Republic-acquired Stevens Metal Products Co. In this letter the Niles division terminated this sale arrangement and advised the wholesaler that thereafter the Niles division would sell the Stevens output direct. Senator Ferguson, seeking to find out Dr. Blair's intention in introducing this letter, asked him whether he wanted a law to go so far as to enable the FTC to dictate that a company must sell through wholesalers? Dr. Blair replied in the negative. When Mr. McMath was asked to comment on this development he said he did not know any of the circumstances on which the Niles division made its decision but that in general he would regard "the elimination of an unnecessary middleman as a very desirable economy."

Mr. Boring testified that the Portsmouth Steel Corp. has a plant with capacity for manufacturing 10,800 steel drums daily but it is idle because operation of the plant "does not fit in with the management's plans. The company desires to sell the equipment."

"What would you say about a law prohibiting you from selling this equipment to other manufacturers?" asked Senator Ferguson.

"It would interfere with our plans," said Mr. Boring.

Supposing Congress enacted S. 104, how much money would the Federal Trade Commission need to prevent antitrust law violations through acquisitions by transfer of assets as well as stocks? asked Senator Ferguson of Mr. Wooden. The latter said he had not given any thought to that matter, but after some colloquy he advanced the opinion that in view of the public interest in the matter an appropriation of $10 million for this purpose would not be out of line.

"On the basis of what has been shown at the hearing," said Senator Ferguson, "it might be money thrown away pretty largely. The subcommittee has no evidence of any sales you would be able to stop even if the law were amended as requested."

Present, Past and Pending

■ MANUFACTURERS' INVENTORIES CONTINUE RISE

WASHINGTON—Value of manufacturers' inventories, on the upgrade more than a year, rose another $375 million in March and reached a new record total of $21.6 billion at month's end.

■ KAISER-FRAZER BEGINS TO EARN MONEY

DETROIT—For the first time since it was organized a year and a half ago Kaiser-Frazer Corp. is making money, says Joseph W. Frazer, president. With 6577 cars shipped in first 19 days of May, the company sees a possibility of exceeding the month's schedule of 11,000.

■ MACHINE TOOL SHIPMENTS DECLINE

CLEVELAND—Machine tool industry's shipments in April were estimated at $26,723,000, a decline from $29,012,000 in March, the National Machine Tool Builders' Association reports.

■ YOUNGSTOWN SHEET & TUBE BIDS ON PLANT

CHICAGO—Offer of Youngstown Sheet & Tube Co., Youngstown, to buy a government surplus electric alloy steel plant at East Chicago, Ind., has been transmitted to Washington for examination by government officials. Wartime operator of the plant, Youngstown Sheet & Tube was the only bidder and offered $510,000 for the facility whose original cost was $1,885,293.

■ TOOL AND DIE MAKERS GET PAY RAISE

CHICAGO—Five hundred tool and die plants here, employing 5000 workers, have signed an agreement with union granting a 15-cents an hour pay raise, retroactive to May 1. Minimum rate will be $1.95 an hour for tool and die makers and $1.80 for machine hands.

■ RECEIVE FRENCH STEEL MILL ORDERS

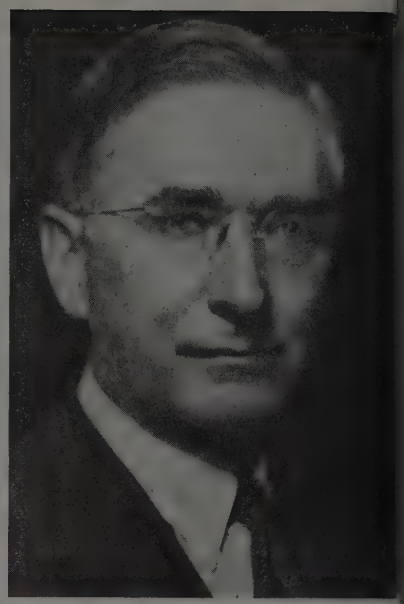
PITTSBURGH—A $6 million order for steel mill electrical equipment has been awarded to Westinghouse Electric Corp. here by the French firm of Denain Anzin. Contract for the rolling mill equipment has been placed with United Engineering Co., Pittsburgh.

■ FOREMEN AT FORD PLANTS GO ON STRIKE

DETROIT—Spurning an unusual last-minute personal appeal from Henry Ford II, 3800 unionized foremen went on strike last week at three Detroit plants of Ford Motor Co. Plant operations were not immediately affected.

EDWARD L. RYERSON

CHARLES E. WILSON



WALTER S. TOWER

Steel Leaders Believe Capacity Adequate for America's Needs

Institute members, meeting in New York, review major economic and technical problems of industry. College president warns of undercurrent toward nationalization of industry. Asks equitable tax, industrial legislation

AMERICA should be aware that "the great undercurrent is still moving in favor of nationalization of American industry," members of the American Iron & Steel Institute were told by Dr. George S. Benson, president, Harding College, Searcy, Ark. Dr. Benson addressed the annual dinner at the institute's 55th general meeting held in New York May 21-22 at Hotel Pierre and the Waldorf-Astoria.

"If America is to survive, proper industrial relations must be achieved," he said. "Equitable industrial legislation must be created. Confiscatory taxation must be replaced by equitable and reasonable tax laws. The secret of our prosperity must be made clear." Dr. Benson asserted that the United States is as far on the road toward nationalization of industry as England was at the close of World War I, and that "unless we change the trend of thinking in this nation another crisis will bring us into nationalization of industry and into mediocrity for everybody."

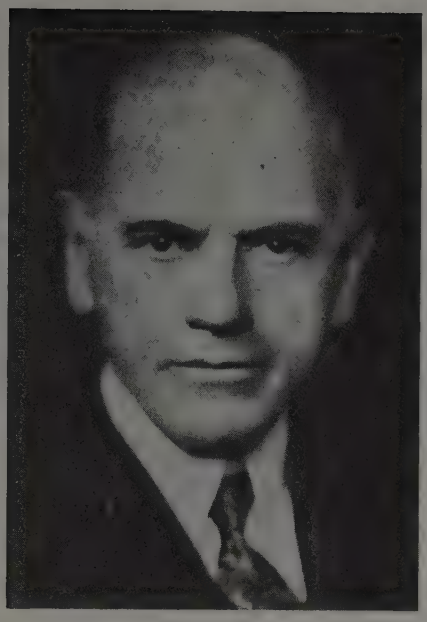
"After spending 11 years outside the boundaries of our own country and having been under more than 20 different flags; I am thoroughly convinced that freedom of individual opportunity is the true secret of national prosperity," he said. "This freedom of individual opportunity permits a nation to draw upon the total brain power of its entire population. America has enjoyed the greatest measure of individual freedom that any great nation ever knew. With that freedom and without great natural resources, we have developed the greatest wealth, prestige and power that any nation ever experienced."

The institute meeting attracted about 1000 members for the two-day session. Starting the program was a morning session on Wednesday, presided over by Quincy Bent, vice president, Bethlehem Steel Co., and featuring the first Schwab Memorial Lecture by Eugene G. Grace, chairman, Bethlehem Steel Corp., and an address on "The Future of the Steel Industry" by Wilfred Sykes, president, Inland Steel Co. Four technical programs were held Wednesday afternoon. The general session was held Thursday morning, with addresses by Walter S. Tower, president of the institute, Charles E. Wilson, president, General Electric Co., and Edward L. Ryerson, chairman, Inland Steel Co. Thursday afternoon was devoted to an industrial relations session under the chairmanship of John A. Stephens, vice president, United States Steel Corp., and to a motion picture depicting "Operation Pluto," the construction and laying of pipelines under the English Channel. Convention closed with the annual dinner Thursday evening.

In the 12 months ending next week, the steel industry will have made close to 80 million tons of steel, almost 15 million tons higher than the best previous year when there was no war influence at work, Mr. Tower told institute members.

"It is a great achievement in the face of various bedeviling circumstances including one railroad strike, two coal strikes and the recurrent menace of

WILFRED SYKES



EUGENE G. GRACE

QUINCY BENT

scanty supplies of some raw materials," said Mr. Tower. "For the current calendar year the rate so far, if it holds, will make a total for 1947 close to 84 million tons."

Mr. Tower asserted that there had been "no runaway prices for steel" in legitimate markets. Today's steel prices, he said, neither restrict nor curtail the use of steel nor prevent the payment of high wages, which are close to 80 per cent above the wages of 10 years ago. Furthermore, he said, steel profits are not unreasonable in relation either to dollar value of products sold or to invested capital. In fact, the rewards of capital in the steel industry have lagged behind the productivity of capital.

The clamor for steel today, he said, recalls the steel industry's experience of 27 years ago following the end of the first world war.

"It was then that the idea of 'accumulated shortages' gained popular acceptance," pointed out Mr. Tower. "Then too, we heard about a steel-starved world. Some prophets of that day saw visions of at least '10 years of unbroken and unparalleled prosperity for the steel industry.' The very next year your furnaces operated 35 per cent of capacity."

Mr. Tower cited that steel ingot capacity increased about 15 million tons during the first world war, but actual output in 1919 and 1920 failed to rise to the level of the wartime peak. At the end of the second world war, he said, after ingot capacity again had expanded about 15 million tons, actual output in 1946 failed, and in 1947 it gives promise of failing, to rise to the level of the wartime peak of 89 million tons.

"The year 1919, like 1946, had its strikes; 1920, like 1947, began with clamor for steel from all sides," he said. "Overseas markets were bare, and insistent. Prices were criticized, but no one refused to buy. Everyone wanted more than he could get. Order books carried many duplications of tonnage. Enthusiastic estimates were freely circulated as to building to be done, automobiles to be made and exports to be shipped.

"Steel was riding high on a wave of optimism when you met in May of 1920. Steel is riding high as you meet here today. I hope that the similarities may not hold beyond this point."

Present annual steel capacity of more than 91 million tons would seem to be ample for our future needs for many years to come, according to Mr. Sykes.

Mr. Sykes based his conclusion upon an analysis of the domestic per capita demand for steel for the period 1920 to 1940, which indicated that the peak per capita consumption amounted to 978 pounds in 1929. He pointed out that this peak consumption rate, plus allowance for 6 million tons of steel for export, would keep only about 84 per cent of the industry's capacity in operation in 1950, and only 86 per cent in 1955. He said that these figures seem to indicate that no expansion in ingot capacity is required in the near future.

However, Mr. Sykes expressed the opinion that he did not believe that today's steel capacity was excessive, since he estimated that "our probable real economic capacity in this country is somewhere around 80 million ingot tons per year, which balances up pretty closely with the anticipated demands within the next five or ten years." He stated that while the present rate of operation exceeds the indicated maximum demand for steel per capita, this is a condition which he feels is temporary.

Mr. Sykes predicted that technological improvements in iron and steelmaking will be evolutionary rather than revolutionary.

"Continued research, either in our own laboratories or co-operatively, will open new fields," he said. "Better quality and low prices will lead to new uses, and I am sure that the industry can look forward confidently to a vigorous, fruitful and profitable future."

"Tinkering in high places" was blamed by Charles E. Wilson, president, General Electric Co., as responsible for the present situation in which many manufacturers have "no real alternative but to increase wages and kick prices a little higher in order to bail out." Mr. Wilson criticized the principal distortions in the price structure with particular reference to raw materials, farm products and clothing, stating that this could not be corrected by direct action but

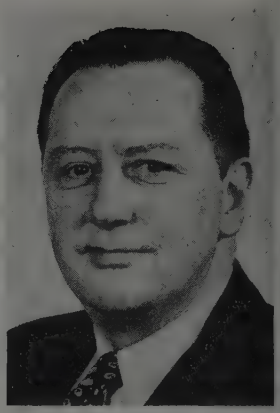
TECHNICAL DIGESTS

Digests of 21 technical papers delivered at the fifty-fifth general meeting of the American Iron & Steel Institute in New York, May 21 and 22, are given on pages 114 to 122 of this issue. More detailed abstracts of some of these papers will appear in later issues of STEEL. In all 24 papers were presented at the technical sessions of the 2-day meeting.

J. E. LOSE

J. L. MAUTHE

EARL M. RICHARDS



HUBERT SMITH

"must wait on the lapse of time, higher productivity and the operation of natural forces." He flatly stated that these distortions could not be removed by any "Newburyport Plan" with or without presidential acclaim.

He said that the two ways in which prices can be brought down in a free economy are: 1. They can be reduced from manufacturer to distributor to retailer, which plan will be put into practice just as soon as it can; and 2. prices can be reduced at the bottom of the structure because buyers will not or cannot buy. He said that the second course was "the path of depression."

Mr. Wilson criticized new deal tactics, because they suffered from "the excesses of zeal, just as unrestricted free enterprise, before it, produced results which were unhappy."

"While we need government in the modern economic picture, its participation must be by law, not by executive whim. Government must participate as an enforcer, as a regulator, and not as a petty tyrant. We must have a government with guts enough to decide an issue on its merits, not able to count the votes."

Much was added to the vast fund of lore on the personality of Charles M. Schwab by Mr. Grace in the Schwab Memorial Lecture.

Mr. Schwab's confidence and magnetism are traditional, but Mr. Grace gave some amazing details upon what Mr. Schwab was able to accomplish by reason of these traits during the formation of Bethlehem. After telling how Mr. Schwab had been turned down by the bankers, Mr. Grace touched upon the vicissitudes of the early financing of Bethlehem, saying: "He got all of the building contractors to accept notes ranging from $20,000 to $200,000 each. The excavating contractor agreed to complete nearly a half-million dollars' worth of work on open account, and offered a loan besides. He prevailed upon several banks, both in Philadelphia and Bethlehem to take various notes of $200,000 each. He prevailed upon the directors of both the Lehigh Valley and the Philadelphia & Reading to accept freight on credit.

"The keynote to Mr. Schwab's genius was his ability to see things in simple, basic principles.

"He radiated vitality. He was tireless. He was warm-hearted and genuine. He was a great believer in the future of the maintenance industries of the United States.

"Mr. Schwab linked low price with regularity in price, which has been characteristic of steel over the last forty odd years. Some critics, seeing the prices on steel products quoted virtually the same by various companies, leap to the conclusion of conspiracy. They do not seem to realize that whenever economic production brings about a lower price quotation from any one company, competition has to meet it."

An extended public relations program to promote a better public understanding of the steel industry was announced by Edward L. Ryerson, chairman of the institute's Public Relations Committee.

It will cover four broad phases: 1. Continued publication of *Steelways* and *Steel Facts* and various booklets and pamphlets that is now being done, also making available material to various individual steel companies; 2. possibility of some use of radio, perhaps 15-minute recorded programs in local steel producing areas; 3. paid advertising in newspapers in steel communities, and advertising in weeklies reaching the farm groups; 4. setting up of community meetings where representatives of the institute can meet local steel people.

HERMAN F. DOBSCHA

A surprise feature of the Thursday morning session was a brief talk by E. H. Lever, chairman, Richard, Thomas, Baldwin Ltd. of England, who predicted that despite present handicaps, both political and otherwise, the British steel industry will pull through eventually to a full and healthy recovery.

Herman F. Dobscha, superintendent of blast furnaces, Edgar Thomson Works, Carnegie-Illinois Steel Corp., Pittsburgh, was given the American Iron & Steel Institute Medal.

The Institute Medal, established in 1927 to perpetuate the memory of Elbert H. Gary, founder and first president of the institute, is awarded for a paper read before the institute, having special merit and importance in connection with the activities and interests of the iron and steel industry.

Mr. Dobscha's medal winning paper, presented at the institute meeting in 1946, was titled, "Effect of Sized and Nodulized Mesabi Iron Ore on Blast Furnace Performance."

Technical sessions and presiding officers were: Coke Ovens, Blast Furnaces and Steelmaking Furnaces, J. E. Lose, vice president, Carnegie-Illinois Steel Corp.; Raw Materials, J. L. Mauthe, vice president, Youngstown Sheet & Tube Co.; Shaping and Forming, Earl M. Richards, vice president, Republic Steel Corp.; General Metallurgy, Hubert Smith, chief metallurgist, Great Lakes Steel Corp.

Study of Design To Accommodate Advantages of Welding Urged

International Acetylene Association told today's designs do not fully capitalize on potential savings in weight possible through use of stronger materials and welding. R. B. Swope elected association president

AN ORGANIZED and systematic study of the whole field of structural design to the end that engineers "visualize the design as being built to accommodate the advantages of welding and not attempt to fit the weld into a strait jacket of design" was proposed to the International Acetylene Association at its 47th annual convention in Cincinnati May 20-21.

The proposal was made by Charles E. MacQuigg, dean of the College of Engineering at Ohio State University since 1937 and formerly manager, Union Carbide & Carbon Research Laboratories.

"My belief is that today engineers are not practically or theoretically capitalizing, to anything like the fullest possibilities, the savings in weight that are potential through the use of stronger materials and welded designs," Dean MacQuigg said. He urged a research project sponsored by technical societies, steelmaking companies, welding equipment manufacturers and others interested.

The convention was attended by about 300 members. R. B. Swope, Southern Oxygen Co., Washington, D. C., was elected president, succeeding Glenn O. Carter, Linde Air Products Co., New York.

The James Turner Morehead medal was presented to Harry A. Campbell, chief inspector, Bureau of Explosives, American Association of Railroads, for his work toward safe practices in handling and transportation of acetylene.

W. T. Whalen, plant engineer, R. K. LeBlond Machine Tool Co., Cincinnati, outlined technique used in "Flame Hardening Machine Tool Parts."

"Mechanized Hard Facing" was the topic of Eldon Hurt, Haynes Stellite Co., Kokomo, Ind.

G. E. Bellow, Air Reduction Co. Inc., New York, spoke on "Applications of Flux-Injection Cutting to Stainless Steel."

A. F. Chouinard, National Cylinder Gas Co., Chicago, discussed "Foundry and Forge Uses of the Oxy-Acetylene Processes."

D. H. Fleming Jr., Linde Air Products Co., Newark, N. J., described powder cutting and scarfing with the oxy-acetylene process.

"Production Methods of Low Temperature Silver Alloy Brazing," a process reported gaining in popularity, was described by A. M. Setapen, Handy & Harman, New York.

J. I. Banash, consulting engineer, spoke on "Fundamentals of the Oxy-Acetylene Welding and Cutting Process."

Dr. F. K. Schoenfeld, B. F. Goodrich Chemical Co., Cleveland, outlined "End Product Uses for Vinyl Resins Derived from Acetylene."

"Fields of Application of the Oxy-Acetylene Process" was the topic of R. B. Swope, Southern Oxygen Co., Washington.

Rail Steel Bar Association Meeting Stresses Research

Appreciable increase in research since its last annual meeting was reported by the Rail Steel Bar Association at its 1947 meeting at the Edgewater Beach Hotel, Chicago, May 8-9.

It was revealed a number of new machines for bending concrete bars have been built and tested, and one or two show considerable improvement over any previously used machine.

Co-operation with the Reinforced Concrete Research Committee of the American Iron & Steel Institute has been marked. To meet demand from consulting engineers and architects for deformations which will increase considerably adhesion of concrete to reinforcing bars, the association's Technical Committee has made definite progress. Several member companies now are prepared to roll revised patterns of deformations which will be of value in preventing cracking of concrete at points of maximum stress.

Standard Practice Committee reported the American Iron & Steel Institute will soon print the new Rail Steel Products Manual, to be known as Bulletin No. 27. Copy for a Rail Steel Commercial Standard will be submitted to the Bureau of Standards, Department of Commerce, in the near future, the committee said.

The Advertising Committee has ready for distribution a large weight card showing areas and weights for the ten standard concrete bar sizes. This card will be of value in designing or detailing reinforced concrete structures.

Conference sessions during the meeting reported that the raw material situation has eased since first of the year. Quantity of available rerolling rails has

(*Please turn to Page* 165)

Calendar of Meetings . . .

May 26-27, Association of Iron & Steel Engineers: Annual spring conference, Benjamin Franklin Hotel, Philadelphia.

May 26-29, American Society of Mechanical Engineers: Aviation meeting, Los Angeles

May 26-29, National Fire Protection Association: 51st annual meeting, Palmer House, Chicago. Association executive offices are at 60 Batterymarch St., Boston.

May 27, Metal Powder Association: Third annual spring meeting at Waldorf-Astoria Hotel, New York.

June 1-6, Society of Automotive Engineers: Summer meeting, French Lick Springs Hotel, French Lick, Ind.

June 2-4, American Gear Manufacturers Association: 31st annual meeting, The Homestead, Hot Springs, Va. Association executive secretary is Newbold C. Goin, Empire Building, Pittsburgh.

June 2-4, National Association of Purchasing Agents: Annual convention, Waldorf-Astoria Hotel, New York. Association headquarters are at 11 Park Place, New York.

June 5-7, Electric Metal Makers Guild Inc.: Fifteenth annual meeting, Hotel Roosevelt, Pittsburgh. Association president is J. F. Arthur, Box 6026, Mt. Washington Sta., Pittsburgh.

June 9-11, American Coke and Coal Chemicals Institute: Annual meeting, French Lick Springs Hotel, French Lick, Ind. Association executive secretary is Samuel Weiss.

June 9-17, University of Iowa: Management course on production planning, job evaluation, motion and time study, wage incentives and related subjects. Iowa City, Iowa.

June 10-13, Special Libraries Association: 38th annual convention, Hotel Drake, Chicago. Association headquarters are at 31 E. 10th St., New York.

June 11-12, American Management Association: Conference on general management problems, Hotel Waldorf-Astoria, New York.

June 12-13, American Society of Mechanical Engineers: Wood industries national conference, Madison, Wis.

June 13, Eastern States Blast Furnace & Coke Oven Association: Annual spring meeting, Chartiers Heights Country Club, Pittsburgh.

June 15-19, American Society of Mechanical Engineers: Semi-annual meeting, Stevens Hotel, Chicago.

June 16-20, American Society for Testing Materials: Fiftieth annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia 3.

June 17-19, Machinery Dealers' National Association: Annual convention, Netherland Plaza Hotel, Cincinnati. R. K. Vinson, 20 North Wacker Dr., Chicago 6, executive director.

June 23-27, American Electroplaters Society: Annual convention and Industrial Finishing Exposition, Detroit. W. J. R. Kennedy, 93 Oak Grove Ave., Springfield, Mass., is executive secretary.

June 23-28, Railway Supply Manufacturers' Association: Convention, Atlantic City, N. J.

June 24-27, National District Heating Association: 38th annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Association secretary is John F. Collins, Jr., 1231 Grant Bldg., Pittsburgh.

July 3-9, International Committee of Scientific Management: Eighth international management congress, Stockholm, Sweden.

July 7-12, First Annual Store Modernization Show: Grand Central Palace, New York. Managing director of the exposition is John W. H. Evans.

Plans Unfolding For 1947 Machine Tool Exhibition

Show, to be held in Dodge-Chicago plant Sept. 17-26, to be twice as large as last one held 12 years ago

DELUGED by a flood of requests for information about the 1947 Machine Tool Show, the National Machine Tool Builders' Association, Cleveland, sees tangible proof of the metalworking industry's interest in the show's slogan "More Goods for More People at Lower Cost."

Stating that advance registrations not only from all over the United States but from foreign countries as well are already very heavy, Herbert H. Pease, president of the association and of the New Britain Machine Co., New Britain, Conn., said: "This amazing response so far in advance demonstrates that leaders of business and industry everywhere are looking toward this first machine tool show in twelve years as the guide post to great industrial advancement."

The show will be held at Chicago from Sept. 17 through Sept. 26 in the Dodge-Chicago plant, described by the association as the only factory building in the world large enough to hold an exhibit of such magnitude. More than 1000 machine tools and related equipment will be in operation during the show and more than 250 American manufacturers will be represented. Exhibits will cover more than 500,000 sq ft of space in the former war plant.

Attendance of 100,000 Expected

The show, the fourth to be presented by the NMTBA, will be more than double the size of the last show, which was held in Cleveland in 1935. An attendance of 100,000 people is anticipated by the association.

According to the association, there are some 220 types of machine tools made in the United States, with additional variations and sizes of each type and combinations of various types, especially along the line of special-purpose machines designed for mass-production techniques. Addition to these of forging machines, various other sorts of metalworking equipment, appliances and accessories will make the show the "world's greatest machine shop," NMTBA reported.

Concurrently with the show will be held the Machine Tool Congress where nightly sessions of papers and discussions will center around the latest developments in the metalworking industry. President of the congress will be K. H. Hobbie, president, Chicago Technical Societies Council. Participating with this group in arranging the program of speakers for the congress will be the American Institute of Bolt, Nut & Rivet Manufacturers, the American Foundrymen's Association, American Machine Tool Distributors' Association, American Society of Mechanical Engineers, American Society of Tool Engineers, National Electrical Manufacturers' Association, Society of Automotive Engineers and the National Machine Tool Builders' Association.

A formal dinner welcoming visiting foreign representatives of the industry will be held at the Palmer House Sept. 23 with Charles J. Stilwell, president, Warner & Swasey Co., Cleveland, as toastmaster.

A show committee headed by Swan E. Bergstrom, sales manager, Cincinnati Milling Machine Co., Cincinnati, has completed the assignment of space for the exhibition. Serving with Mr. Bergstrom on this committee are: William L. Dolle, president, Lodge & Shipley Machine Tool Co.; R. W. Glasner, president, Clearing Machine Corp.; Helge G. Hoglund, vice president, Van Norman Co.; Ralph J. Kraut, president, Giddings & Lewis Machine Tool Co.; Donald M. Pattison, vice president, Warner & Swasey Co.; and Louis Polk, president, Sheffield Corp.

Serving on the Chicago committee are: Chairman, Rudolph W. Glasner, president, Clearing Machine Corp.; vice chairman, George Habicht, president, Marshall & Huschart Machinery Co.; Edward K. Welles, president, Charles H. Besly & Co.; A. G. Bryant, vice president, Cleereman Machine Tool Co.; Harold B. Smith, president, Illinois Tool Works; Norton A. Booz, president, Federal Machinery Sales Co.; M. J. Wiora, vice president, Bryant Machinery & Engineering Co.; and E. Porter Essley, vice president, E. L. Essley Machinery Co.

On the registration committee are the following: Chairman, Helge G. Hoglund, vice president, Van Norman Co.; T. B. Buell, sales manager, Sundstrand Machine Tool Co.; Kirke W. Connor, president, Micromatic Hone Corp.; E. Blakeney Gleason, vice president, Gleason Works; Frank Moran, vice president and sales manager, Carlton Machine Tool Co.; and Robert R. Rhodehamel, general sales manager, National Acme Co.

CHECK TURBINE RUNNER: On the rotary table of the 40-ft boring mill at Allis-Chalmers Mfg. Co., West Allis, Wis., Vice President James M. White checks up on the spherical turn of a 21½-ft diameter hydraulic turbine runner for TVA's Kentucky Dam. The cast steel adjustable blade runner is for the fifth turbine in the dam, rated 44,000-hp, 48-ft head, 78.3 rpm

Local Groups Named To Aid In Sale of WAA-Held Scrap

Appointment of local committees to co-operate with each of the regional War Assets Administration offices was announced recently by Robert W. Wolcott, president of Lukens Steel Co., Coatesville, Pa., and chairman of the recently formed Steel, Foundry & Scrap Industries Committee for Expediting Iron & Steel Scrap.

It will be the purpose of these local committees to speed disposal of ferrous scrap in WAA's possession.

Metalworking Industry's Income Up

RISING operations in the metalworking industry during the first quarter of 1947 were accompanied by a moderate increase in net profit over the fourth quarter of 1946.

In the accompanying compilation by STEEL, 50 companies representing a broad cross-section of the metalworking industry had aggregate net profit of $71,260,251, a 3.7 per cent increase over the $68,695,480 reported by these same companies in the final quarter of 1946. Interestingly, the average of the Federal Reserve Board's durable goods production index for the first quarter of 1947 was 4.7 per cent above the average for the last quarter of 1946.

While three of the 50 companies showed a net loss for the fourth quarter of 1946 only one did so for the first quarter of 1947. However, 27 showed smaller net profits in the first quarter of 1947 than in the fourth quarter of last year. This performance in a period when durable goods production was up suggests that perhaps the crest in dollar volume of net earnings has been reached.

Commenting on first quarter industrial earnings, the National City Bank of New York pointed out recently that in the period 1923-1947 business has enjoyed not more than two consecutive quarters of such high earnings as were recorded in the final quarter of 1946 and the initial quarter of 1947.

The bank furthermore said: "Taking account of the new round of wage increases now going into effect, recent price declines, and the rapid shifting in many lines from sellers' to buyers' markets, there appears to be little doubt but that the peak of business earnings generally was reached in the past two quarters."

Dependent to a great extent on steel, the durable goods industry cannot hope for a near-term improvement in the steel supply that would permit a further substantial increase in production rates.

While on the one hand it cannot look to substantial production gains to raise its profit volume, the metalworking industry is faced on the other hand with increased costs of labor and materials.

	First Quarter 1947	Fourth Quarter 1946	First Quarter 1946	Calendar Year 1946	First Quarter 1941	First Quarter 1940
Air-Way Electric Appliance Co.	$194,680	$220,330	$20,213	$389,444	$25,221	$9,594
American Brake Shoe Co.	1,510,444	1,555,607	329,236	4,005,029	886,763	582,562
American Machine & Metals Inc.	191,856	97,495	79,088	343,392	197,385	18,476*
American Radiator & Standard Sanitary Corp.	3,478,212	6,684,072	712,255	9,905,543	1,595,966	440,754
American Stove Co.	385,334	509,848	3,591	1,185,567	245,589	111,188
Atlas Tack Corp.	74,199	55,728	32,849	192,618	34,303	28,738
Belden Mfg. Co.	419,476	241,947	122,566	765,311	182,915	100,178
Borg-Warner Corp.	4,684,481	4,882,814	810,772	9,034,828	2,367,597	1,475,218
Briggs & Stratton Corp.	619,878	668,018	243,517	1,870,086	377,029	398,894
Caterpillar Tractor Co.	1,929,624	1,717,054	1,051,992	6,111,591	2,412,272	1,470,046
Chapman Valve Mfg. Co.	99,372	65,021	107,161	351,443	214,886	156,492
Chicago Railway Equipment Co.	108,158	145,682	75,976*	308,418	154,776	140,125
Chrysler Corp.	21,502,408	16,596,645	829,929*	26,889,290	9,561,982	15,742,388
Clark Equipment Co.	669,760	961,912	417,699*	1,009,801	505,192	548,195
Cleveland Graphite Bronze Co.	1,055,823	964,992	218,214	2,468,877	543,217	436,740
Cutler-Hammer Inc.	573,599	633,453	112,703	1,604,766	427,101	406,295
Diamond T Motor Car Co.	466,280	738,231	195,289	964,217	168,824	22,536
Eaton Mfg. Co.	1,793,095	1,792,152	81,526	3,585,881	982,712	937,878
Gabriel Co.	115,968	184,979	51,564	422,015	3,310*	13,249*
General Cable Corp.	1,628,298	1,711,702	2,231,405*	3,045,421	1,006,006	727,425
Greenfield Tap & Die Corp.	244,926	345,722	167,730	1,081,773	137,780	116,633
Holland Furnace Co.	118,598 *	786,394	70,990*	1,986,600	112,480*	119,241*
Houdaille-Hershey Corp.	836,065	669,389	269,002*	1,487,131	592,679	761,656
International Business Machines Corp.	5,303,148	5,650,448	4,073,310	18,766,434	2,409,123	2,200,504
Kalamazoo Stove & Furnace Co.	41,267	110,213	28,373*	180,421*	28,878*	109,202*
Link-Belt Co.	1,489,460	2,249,373	372,435	4,443,280	566,335	423,956
Lynch Corp.	295,561	302,858	193,327	771,330	127,790	119,945
Mack Trucks Inc.	1,380,759	565,568*	411,658	882,194*	659,359	111,448
Marion Power Shovel Co.	211,638	49,587	323,160*	129,456	177,784	62,392
Maytag Co.	1,141,353	960,321	399,068	3,027,930	521,206	356,384
Minneapolis-Honeywell Regulator Co.	1,808,514	2,206,948	652,959	5,119,143	554,124	294,704
Motor Wheel Corp.	628,252	527,764	199,459	1,240,005	636,635	614,208
Mullins Mfg. Corp.	959,585	743,281	687,998*	1,084,121	230,044	52,951
National Acme Co.	605,435	754,804	633,798	2,615,755	921,133	515,546
National Cash Register Co.	2,373,669	2,035,476	343,206*	3,351,215	496,072	480,871
National Supply Co.	1,771,024	898,264	610,757	3,027,836	801,584	426,228
Noblitt-Sparks Industries Inc.	372,491	416,438	447,192*	670,185	289,412	286,049
Simonds Saw & Steel Co.	858,892	763,980	470,896	3,004,035	624,081	393,322
Square D Co.	784,545	1,186,399	356,105	2,704,627	764,179	400,858
Studebaker Corp.	1,655,760	1,200,578	129,760*	948,808	180,459	511,503
Symington-Gould Corp.	20,859	246,117	497,490*	312,444	190,693	499,971
Telautograph Corp.	32,091	10,445*	46,152	128,099	21,894	30,259
Twin Coach Co.	332,700	570,288*	328,603*	1,618,757*	231,038	74,588
United-Carr Fastener Corp.	368,511	592,550	92,699	1,006,705	313,272	158,100
U. S. Hoffman Machinery Corp.	308,516	576,373	393,937	1,967,602	237,144	51,414
Victor Equipment Co.	101,925	189,741	8,774	449,847	49,083	35,148
Westinghouse Air Brake Co.	3,382,263	2,950,818	2,413,245	9,699,533	2,105,362	1,847,140
Weston Elec. Instrument Corp.	309,683	129,502	270,875	1,140,582	256,388	284,120
Worthington Pump & Machry. Corp.	1,702,657	1,315,623	1,550,540*	3,605,239	700,192	552,805
Yale & Towne Mfg. Co.	556,355	1,554,868	742,771*	1,030,418	522,302	214,022
Totals	$71,260,251	$68,695,480	$6,415,626	$146,572,299	$37,062,215	$35,351,803

*Net loss.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Republicans admit they will be unable to cut President's budget by hoped-for $4 to $5 billion. Resentment in West over sharp slashes in funds for Bureau of Reclamation cools ardor of economy-minded congressmen

REPUBLICAN leaders in Congress have given up hopes of cutting the President's 1948 budget of $37.5 billion by anything like the hoped-for $4 to $5 billion.

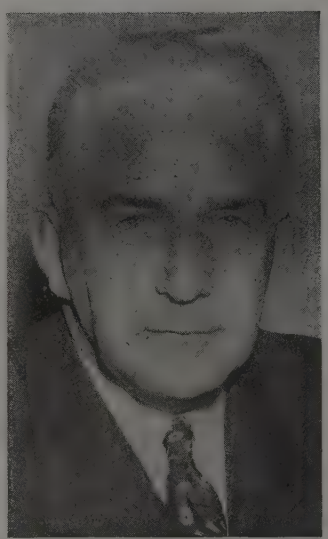
The axe-wielding House Appropriations Committee came up with a total reduction of only $1,647 million on the first five bills it reported, and it appears the savings on the next two big budgets —those of the War and Agricultural Departments— will not be sufficient to prove that the President's recommendations were far out of line. And the Senate may not want to go along with all the savings approved by the House.

To some extent western resentment against the sharp cuts dealt the Bureau of Reclamation has a dampening effect on economy-minded congressmen. At the same time, it is clearly apparent that the economy drive is not over. Key Republicans on the House Appropriations Committee complain about the difficulties placed in their path by the uncooperative attitude of heads of administrative agencies. In not a single case, they say, did they find an administrator who was ready to admit that any cuts could be made in his budget. In many cases the attitude encountered was much less than frank. Next year, said one of these congressmen, they will be laying for some of these people.

Metals Act May Be Drafted

Partly to allay the storm of resentment in the western states, a new metals and minerals policy may be drafted by the Congress before the summer adjournment. If the senators and representatives from the states with marginal and submarginal mineral properties get their bills passed they are going to have good news to talk about when they get back home. In brief, these bills would establish a price support plan under which many marginal and submarginal mines could be operated with profits at the taxpayers' expense.

One of these bills, H. R. 2455, has been reported out by the House Committee on Public Lands and now is in the House Rules Committee with a good chance of favorable action. Introduced by Rep. Charles H. Russell (Rep., Nev.), it would authorize the Reconstruction Finance Corp. to subsidize minerals and metals production to the extent of $80 million annually. The amount of the subsidy would be the difference between present market prices and the highest prices paid during the war years 1942-1946 inclusive.



NOMINATED: George J. Schoeneman, Newport, R. I., has been nominated by President Truman to succeed Joseph D. Nunan Jr. as Commissioner of Internal Revenue, effective June 30. Schoeneman, who was special executive assistant to the President, served 25 years with the BIR. NEA photo

The responsibility for directing purchases on a subsidy basis would be placed in a new National Minerals Resources Division of the Department of the Interior. The bill would transfer to that division all the functions of the present Office of Premium Price Plan for Copper, Lead and Zinc. It authorizes subsidies on these three metals as determined by the formula, "The market price plus the conservation payment for recoverable metal must in no case exceed, for copper, 28 cents per pound; for lead, 18 cents per pound; and for zinc, 18 cents per pound."

Mr. Russell told STEEL that the reason for mentioning only these three metals in the bill is their scarcity, and the obvious fact that their production should be encouraged. As to the other minerals and metals that will qualify for subsidies under the bill, Mr. Russell said that will be a policy matter to be determined by the director of the new National Minerals Resources Division, under the direction of the Secretary of the Interior and the President. It can be assumed, he said, that the minerals that will qualify for conservation payments will be selected from those on the Army-Navy Munitions Board's critical and strategic list.

In the Senate, the companion bill is S. 1136, introduced by Sen. Pat McCarran (Dem., Nev.). Hearings are being conducted by a National Resources Economic Subcommittee of the Senate Public Lands Committee. Sen. George W. Malone (Rep., Nev.) is the subcommittee chairman.

The bill referred to above, it will be noted, provides for subsidies only for critical and strategic minerals and metals. A much broader bill now is under preparation by Senator Malone and soon will be dropped into the Senate hopper. Its exact provisions have not yet been announced. In a general way, however, it provides for a parity mining support program something along the line of the present farm price support program. Metal prices over the period 1924-1929 would be tabulated and their relationship to commodity prices over that period determined. The resulting index would be used in setting a permanent mineral price support program that would bring everlasting cheer to many communities that would like to continue the prosperity they enjoyed during the war years in producing minerals from high-cost operations.

Business Outlook Sought

The Joint Committee on the Economic Report is employing a two-way approach in its study to determine to what extent the second half of 1947 will be inflationary or deflationary in character. The Subcommittee on Price Questionnaire, headed by Sen. Ralph E. Flanders (Rep., Vt.), will conduct one questionnaire through its own staff in Washington, and Dun & Bradstreet Inc., New York, has begun a sampling for the committee.

The Dun & Bradstreet assignment got under way May 10 when that company mailed copies of three questionnaires to "600 leaders in industry, trade, finance, agriculture and labor." The subcommittee has not yet determined what segments of industry to cover with its questionnaire, nor what questions to

The CONE AUTOMATIC MACHINE COMPANY

sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

"Styrofoam," styron plastic expanded 40 times into a multicellular, foamlike mass, is being offered by Dow Chemical Co., as an insulating material.

get ready with CONE for tomorrow

Soft enough to be machined, punched or drawn, two new magnet metals, Cunico and Cunife, have been developed by General Electric Co.

be ready with CONE for today

Large and complex glass-to-metal seals are made at Westinghouse Lamp Division by spraying liquid-suspended powdered glass on hot Kovar metal.

get ready with CONE for tomorrow

Especially intended to prevent shifting of loads in freight cars and trucks, Load-Lok, a glue made by National Adhesives, has high sheer strength, but can be broken at will in unloading.

be ready with CONE for today

The new Lycoming XR-7755, a 36-cylinder radial, develops 5,000 h.p. at 2,600 r.p.m., and is said to be the world's most powerful aircraft engine.

get ready with CONE for tomorrow

The U. S. Department of Agriculture is now operating an experimental alcohol plant at Peoria with a capacity of 500 gallons per day from farm waste.

be ready with CONE for today

U. S. Rubber Co. is selling a lighter-than-cork cellular rubber that is resistant to moisture, fire, rot, acid, oil, vermin and termites.

get ready with CONE for tomorrow

Union Pacific R. R. has placed orders for 64 diesel-electric locomotives. This is said to be the largest order for diesel-electric locomotives in railroad history.

Atlantic Coast Fisheries Co. has developed a machine with which one operator can fillet haddock at the rate of 45 per minute.

get ready with CONE for tomorrow

Barber-Colman Co. has a new machine to automatically perform threading-up operations on textile looms by the use of punched cards.

be ready with CONE for today

The Pennsylvania Coal Co. will supply its miners with music by means of loud speakers at the top and bottom of the mine shaft.

get ready with CONE for tomorrow

A simple change in tread design makes the new Firestone Tractor Tire out-pull previous tires.

The Spang-Chalfant Div. of National Supply Co. in Pittsburgh is making steel pipe with a baked-on phenolic plastic coating which has been tested for several years in the oil fields.

be ready with CONE for today

Hobart Bros. Co. has designed a self-propelled and self-powered mobile arc welder for use in railway yards, oil refineries and large factories.

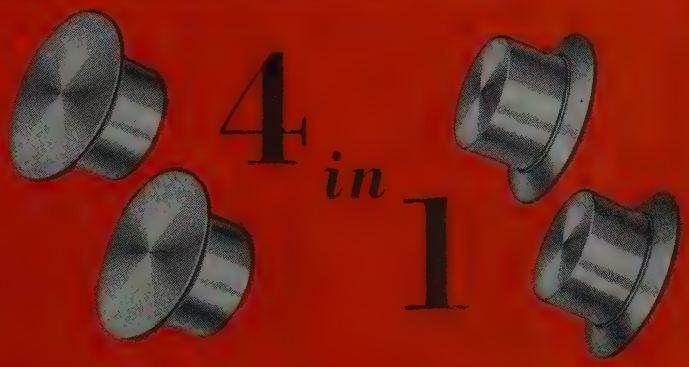
get ready with CONE for tomorrow

The thumbnail size silicon crystals made by Sylvania Electric Products can be used as first detectors in superheterodyne receivers, and unlike tubes, require little space and no filament supply.

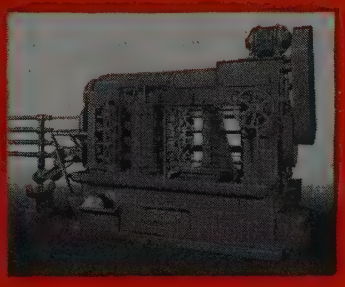
be ready with CONE for today

The Locomotive Development Committee of Bituminous Coal Research expects to conduct on-the-rail tests of its coal-fired gas turbine locomotive this summer.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION



Four parts in the time for one is profitable production. The pieces shown are made, four at a time, from SAE 1112 in 5½ seconds each. Investigate profit possibilities of the Conomatic Vertical in your shop. Write for information.



Ask your CONE *representative to show you our new color motion picture*

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AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

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put in it. It may take a few weeks to reach agreement on these points. Members of Senator Flanders' subcommittee are: Representatives Edward J. Hart (Dem., N. J.), Robert F. Rich (Rep., Pa.) and Sen. Joseph C. O'Mahoney (Dem., Wyo.).

The principal Dun & Bradstreet questionnaire asks the question "How do you expect the second half of 1947 to compare with the second half of 1946?" Answers are requested under the following breakdowns: 1—In output per man hour; 2—in labor cost per unit of output; 3—in total number of employees; 4—in weekly hours worked per employee; 5—in dollar volume of net sales; 6—in physical or unit volume of net sales; 7—in physical volume of output; 8—in dollar volume of inventories; 9—in dollar volume of net profits after taxes (under present corporation taxes); 10—in profits as a per cent of net sales; 11—in plant capacity; and 12—in fixed investment (dollar value).

The second Dun & Bradstreet questionnaire asks "What changes do you expect to occur between the present date and Dec. 31, 1947?" under the following breakdowns: 1—in prices paid for raw materials and semifinished goods; 2—in selling prices of producers' durable and consumers' durable goods, and consumers' soft goods; 3—in prices paid for construction; and 4—in wage rates.

The third questionnaire asks for opinions as to: 1—What rent ceilings should be; 2—what sort of encouragement to housing construction should be given by the federal government; and 3—what the future government policy should be in regard to supporting prices on farm products.

Dun & Bradstreet Inc. is expected to submit a tabulation on results of these three questionnaires in the week of May 26.

May Act on Stream Pollution

Federal stream pollution control, which has been discussed on three previous occasions in the past 12 years, has a chance of adoption in the 80th Congress. Most of the statements in recent hearings of the Stream Pollution Subcommittee of the Senate Public Works Committee, heard largely from affected federal, state and municipal officials, and from anglers' and other interested associations, favored inauguration of federal control.

A surprising feature, in view of the great expense to which industry is put not only in preventing stream pollution but in treating water that has been polluted upstream, was the sparse industry representation at the hearings. Many large-scale users of water, as the steel industry, were not represented at all.

Industrial spokesmen appeared for the paper and pulp, petroleum and gas, and mining industries—particularly coal mining. Petroleum and gas witnesses pointed out that oil pollution of navigable streams already is covered by federal law, and they thought that the federal government should not go any farther at this time. The other industrial spokesmen—paper and pulp and coal and other mining—objected to enactment of any federal control and thought the matter should be left with the states as at present. All the industrial spokesmen told of the efforts they are making—with considerable success—in abating stream pollution.

The subcommittee is studying S. 418, introduced by Senator Barkley with the backing of Senator Taft. It would authorize federal grants-in-aid and loans to the total of $100 million annually; states and municipalities would be eligible to receive grants and loans, and industries could get loans payable in 10 years with interest at the prevailing government rate. States, municipalities and industries would have two years in which to obey federal orders for abatement of specified pollution, and five years where financial inability prevented earlier action. After that the government could enter an equity suit on the ground that the specified pollution endangered public health and welfare. The bill also authorizes federal spending of $1,500,000 annually in drawing plans, generally on the basis of entire watersheds, for abatement or prevention of stream pollution.

Ship Toll on Seaway Proposed

The St. Lawrence combination seaway and hydroelectric project now is before the 80th Congress with provisions aimed at making the seaway, like the power portion of the program, self-liquidating. This would be accomplished by charging tolls on ships and their cargoes, much like the system in operation at the Panama Canal. The House bill, H. J. Res. 194, introduced by Rep. George Dondero (Rep., Mich.), has been referred to the House Public Works Committee. The Senate bill, S. J. Res. 111, introduced by Sen. Arthur Vandenberg (Rep., Mich.), has been referred to the Senate Foreign Relations Committee which has tentatively scheduled hearings to start May 28.

Loans $250 Million to France

The International Bank for Reconstruction & Development made its first loan, $250 million to Credit National, a semipublic French corporation, as an aid to projected French government steps to rehabilitate and develop the French economy.

A portion of the proceeds will be used for modernization of the French steel industry, including construction of modern strip mill, it was announced. Purchase of locomotives, freight cars, cargo ships, canal barges and commercial airplanes are contemplated for improvement of the French transportation system.

Also planned are purchases of industrial raw materials, including semi-finished steel products and nonferrous raw materials and coal and oil.

Although the French government will be free to purchase in whichever markets are most advantageous, full information to the lending bank will be made concerning goods purchased, their destination and utilization.

Because of its size and productive capacity, France is pivotal in western Europe, the bank said in explaining its loan. Economic rehabilitation of France will speed recovery of surrounding countries and restore international trade.

The original application was for $500 million and a further loan may be made later, but is not now under consideration, the bank stated.

Oil Firm Plans Modernization

Expenditure of over $200 million contemplated by Standard-Vacuum Oil Co. in the next five years for rehabilitation and modernization of its oil fields and refineries abroad, P. W. Parker, company chairman, testified recently before the House Ways & Means Committee where he was discussing reciprocal trade agreements.

A very large part of the expenditure will go for materials and equipment to be purchased in this country, he told the committee. Since the end of the war, he continued, the company's bill for supplies of various kinds purchased in the United States has totaled in excess of $[illegible] million.

Diesels Recommended

Demand for diesel equipment should receive a lift as a result of a statement by the Bureau of Mines that "numerous hazards arising from the transportation of coal in the nation's underground mines can be avoided by using diesel locomotives."

The bureau's findings are contained in Information Circular 7406.

Ore Studies Available

Results of iron ore explorations are set forth in Reports of Investigations 4054 and 4045, copies of which may be had free from the Bureau of Mines, Washington 25. The former describes iron deposits in Okanogan County, Wash., and the latter in Llano and Mason Counties, Texas.

Germany's Iron and Steel Industry Undergoing General Transformation

Large corporations being broken up and plants leased to newly formed companies. Industry subject to many production and financial controls. Prices insufficient to cover costs. Production is at annual rate of 2.5 million tons

DUSSELDORF, GERMANY

GERMANY'S steel industry is in the midst of a general transformation. It is subject to many controls. Socialization and the breaking up of the large corporations are slogans of the day, and no one knows how the industry will be organized a few months hence.

In the British and American zones, steel plants are subject to two systems of control—production and financial.

Production control has been assigned to the "Office of Iron & Steel" which was created in the fall of 1945 and recently was incorporated in the "Bi-zonal Office of Production Management" established by the Americans and British at Minden. The Office of Iron & Steel controls output strictly, setting schedules, planning raw materials supplies and regulating the sale of steel products according to detailed quota arrangements.

Financial control is independent of production control and was established in the fall of 1946, after the coal mines and coke ovens of the Ruhr district had been confiscated by the British military government. All the larger iron and steel plants were taken over by the British in August, 1946, and the "North German Iron & Steel Control" was created as a special branch of the Control Commission for Germany (British element), and in turn created a custodian office for the industry. The office is staffed with Germans and is headed by Henrich Dinkelbach, a former member of the board of the German Steel Trust. (Vereinigte Stahlwerke A.G.). The custodian office receives its instructions from the British Deputy Controller General and its main job is to prepare the grounds for the final disposition of the steel industry in the British zone.

The smashing of the trust companies started at the end of last year and at least four steel plants already have been separated from their parent concerns and transferred to newly established companies. The new companies are working the plants under lease. Boards of the new companies are composed of representative trade unions, the public administration and the custodian office. Private business is represented only in a minority, usually by managing directors, and bankers are not represented at all.

Present plans call for establishment of more new companies to take over 10 or 12 additional steel plants from the former German corporations, although details have not been announced.

Results of the four new companies to date have been unsatisfactory. All have incurred heavy losses and their business is clouded by many uncertainties. An application for an increase in steel ingot prices by 52.50 reichsmarks ($5.25) a ton is pending before the Allied Control Council at Berlin, but no decision has been handed down. The present price structure involves a loss of from 60 to 70 reichsmarks ($6 to $7) for each ton of steel produced.

Under the procedure being followed, the parent companies will be permitted to keep only a few plants, mainly processing units. They are required to keep all liabilities, however, and their solvency is seriously endangered. The parent companies are deep in the red and are unable to pay interest on their obligations, some of which are held by Americans. The agreements for leasing the steel plants to the newly formed companies provides for no rentals at present and it will be up to the custodian office to fix a compensation after the lease has expired.

The entire program remains to be clarified. It is not even known whether all this is socialization or not. It has not yet been decided who will become owners of the shares in the new companies. Temporarily, the new shares are held by the custodian office, but whoever eventually gets hold of them will become the real boss of the Ruhr steel industry.

German steel exports, which averaged 2.4 million tons annually before the war, are today only a trickle. Total production in Germany at annual rate of 2.5 million tons is barely more than prewar exports.

FRENCH WORKERS END STRIKE: Workers at the Renault Motor Co. returned to their jobs after the government granted a 3-franc bonus on production and a flat payment of 1600 francs to all workers to cover loss of pay during the strike period. The concessions will force the government to depart from the strict price-freezing principle adopted under Leon Blum. NEA photo

Recommends Protective Tariff Be Abandoned

JAMSHEDPUR, INDIA

Indian Tariff Board has reported on protection for the iron and steel industry. The board says that the iron and steel industry, which has been a protected industry since 1924, is no longer in need of protection and recommends that the existing protective duties should be allowed to lapse and be replaced by revenue duties. However, alloy, tool and special steels, high silicon electrical steel sheets and high carbon and spring steel wires would continue to enjoy the benefit of the existing protective duties.

California Oil Activity Spurs Steel Demands

Marked increase in well drilling reported in area with price of crude petroleum up and demand depleting reserves

SAN FRANCISCO

EXPANDING market for steel products is foreseen in increased activity underway in California oil fields. This upturn is the result of two factors: Increase in prices for crude petroleum is making it more profitable for oil companies to drill wells, both wildcatting ventures and in proven fields. Secondly, heavy demand for oil is depleting California's underground reserves to the point additional finds are becoming necessary.

These influences began showing up in well drilling reports for March, and the upturns have been continuing since. In that month 172 new drilling rigs were set up, largest, with one exception, of any month since the war ended. Based on current weekly reports, it is indicated new drilling ventures now number around 200 a month. From Jan. 1 to May 10 this year, notices of 726 new wells have been filed compared with 666 in the like period last year, and deepening and redrilling jobs for the same period this year number 337 compared with 314 in the 1946 period.

Oil well drilling operations require large amounts of steel. That is particularly true on deep-drilling jobs of 5000 feet or more on which the largest use of steel products is drilling pipe and, in case of successful wells, steel well casing pipe. Other steel products go into derricks, drilling bits, and other oil field machinery.

Drilling costs have been advancing rapidly in recent months. During the last year costs are estimated to have gone about 15 per cent above last year's level, and currently they average about two and one-half times prewar costs.

Although shallow wells can be drilled at a cost of about $25,000 at present, deep wells (13,000 feet or more) cost anywhere from $750,000 to $1 million. The 172 new drilling rigs set up in March, for example, are estimated to total an investment of around $30 million.

SILVER STRIKE: American Silver Corp.'s President N. J. Elliott points to the beginning of the "Tomboy" silver vein in Panamint City, Calif. Samples were assayed at $12.70 per ton. Vein extends from gouge (dark area) for 10½ ft. NEA photo

Texas Construction $71,000 Ahead of Like 1946 Period

With $212,724,533 awarded in contracts so far this year, building and construction in Texas was almost $71,000 ahead of the same period last year. According to *The Texas Contractor* construction and building totals in the state this year appear to be headed for a figure double those of 1946, despite a heavy volume of commercial and industrial projects deferred because of high costs or uncertainty in estimating end costs.

Geneva Steel Signs New Contract with Union

A labor agreement extending over the next two years has been signed between Geneva Steel Co. and Local 2701 of the United Steelworkers of America (C.I.O.).

The contract affects approximately 3000 employees of the company. Although it does not expire until Apr. 30, 1949, it may be reopened by either side on the question of wages after a period of one year.

The agreement, patterned after the national steel contract, established a straight 12½ cent an hour wage increase plus 2½ cents in improved vacations, improved holidays and an improved wage equity program. The 12½ cent wage increase is retroactive to Apr. 1, 1947, and brings the hourly rate for common labor to $1.09.

The new agreement specifies a survey shall be started on a program of hospital and sickness benefits and on an old age retirement system. This study is to be completed by union and company representatives before Oct. 1.

A new provision is a clause granting severance pay in event of a shutdown in a department or in the plant. Men with three to five years on the payroll would receive four weeks' severance pay; six weeks' pay for five to seven years of service; seven weeks' pay for seven to ten years of service; and those with more than ten years of service would get eight weeks' pay.

Production of Heavy Steel Shipping Barrels Increases

Production increases in heavy type steel shipping barrels and drums, and steel packages, kegs and pails were reported for March by the U. S. Bureau of the Census. A slight decline was registered in output of light type steel barrels and drums.

March production of heavy type barrels and drums totaled 2,291,080 units, compared with 2,063,690 in February, and output of steel packages, kegs and pails was 5,304,124 units in March, compared with 4,977,719 in February. Production of light type barrels and drums in March totaled 593,069 units, against 595,505 in February.

Unfilled orders for the three groups were slightly lower at the end of March than at the end of February.

Scrap Survey of Pacific Battlefields Gets Started

Search for steel scrap on the battlefields of the Southwest Pacific has been started by experts of industries and agencies interested in increasing scrap supplies. This group will tour scrap accumulations at Manila, Guam, Manus and Okinawa. The tour is sponsored by the Navy.

L. G. Knight, manager of purchases

and traffic in the Seattle and Portland district of Bethlehem Pacific Coast Steel Corp., was named representative of the American steel industry by the American Iron & Steel Institute. Mr. Knight has been associated with steel scrap purchasing for 35 years.

Prior to the present tour of the Pacific, similar surveys have been made in Britain, France, Belgium and Germany. It is believed the Pacific survey will disclose large supplies of metal.

For example, it is known that in the harbor of Manila, numerous vessels lie sunken and must be raised and removed to clear the harbor of obstacles dangerous to shipping. Thousands of tons of steel scrap suitable for steelmaking are believed recoverable from these wrecks, and from damaged and abandoned ordnance, vehicles and other equipment.

Society for Metals Appoints 1947 Nominating Committee

In preparation for election of officers of the American Society for Metals at the organization's annual meeting in Chicago next October, Society President A. L. Boegehold has appointed nine members to comprise the nominating committee for 1947.

To select nominees for president, vice president, treasurer and two trustees, the committee will represent the society's 21,000 members and 71 chapters in the United States and Canada.

Members of the committee are: Chairman, A. H. d'Arcambal, vice president, Pratt & Whitney, West Hartford, Conn.; C. K. Lockwood, Shawinigan Chemicals Ltd., Montreal, Canada; S. P. Watkins, Rustless Iron & Steel Division, Baltimore; Dr. R. J. Radebaugh, University of Rochester, Rochester, N. Y.; Arthur Winston, Dow Chemical Co., Midland, Mich.; Thomas G. Harvey, Monarch Steel Co., Indianapolis; Dr. R. L. Dowdell, University of Minnesota, Minneapolis; W. E. Burndett, Hughes Tool Co., Houston, Tex.; and Floyd Anderson, Gardner-Denver Co., Denver.

Pressure on WAA Advised To Speed Sale of Steel

A demand that Congress put pressure on War Assets Administration, in connection with possession by that agency of "157,000,000 lbs of steel," was voiced in the House last week by Congressman John Taber, economy axe-wielder in Congress.

Calling attention to advertisements indicating that WAA was holding that amount of steel in 33 regional offices, Congressman Taber said: "If you put the pressure on that gang, they may sell the stuff where it will do some good."

Senate Small Business Committee Resumes Steel Shortage Hearings

Takes testimony from manufacturers complaining of inability to obtain adequate supplies and being compelled to pay exorbitant prices in the "gray" market. Fabricators furnished steel by customers

MOUNTING complaints from smaller manufacturers that they have been unable to obtain steel for critical production items, and protests of "gray market" steel prices, last week led the Steel Subcommittee of the Senate Committee on Small Business to resume hearings on steel shortages.

The hearings were called after subcommittee staff members had conducted two weeks' investigation of many complaints referred to the committee as well as alleged withdrawal of steel companies from established distribution in particular areas.

The hearings are continuing, with additional witnesses subpoenaed for further appearance before the subcommittee, of which Senator Edward Martin, of Pennsylvania, is chairman.

Those who have been heard so far are representatives of smaller manufacturers who have complained to the committee that they are unable to get steel for critical housing program items, or have been compelled to pay "gray market" prices for steel they did obtain.

Customers Reported Furnishing Steel

An early witness when hearings resumed was M. J. Kohnstamm, purchasing representative, Morrison Steel Products Inc., Buffalo, N. Y., making warm air furnaces for the housing program. He told of one lot of 58 tons of cold-rolled steel delivered into his plant by a customer, who advised the company it had paid $237 per ton, fob New York, for the steel. Mr. Kohnstamm explained that frequently customers had furnished him steel when he was unable to get it.

However, through attached manifests, Mr. Kohnstamm said, this lot was traced to the producing mill, which in turn traced it to a previous customer. The mill, he said, reported the matter to the Compliance Division of CPA, and he added, "we understand that proper action was taken."

Mr. Kohnstamm said his current needs totaled 20,000 tons per year, and in the first quarter, 1947, his company has received 2800 tons of steel, of which 1000 tons were supplied by customers, in order to maintain their own output. This left a net of 1800 tons supplied by mills, he continued, of which 1000 tons were obtained on CC ratings established by CPA for furnace manufacture.

"It is obvious," he said, "that it will be impossible for us to meet our own or our customers' requirements for 1947 production."

He charged that in the case of steel furnished by the company's customers, "we have certain knowledge that our customers were obliged to pay prices far in excess of normal mill or warehouse costs."

Another witness, August C. Studer Jr., receiver for Stangard-Dickerson Corp., with plants at Newark and Paterson, N. J., told of paying between January and May 12, 1947, an excess of $65,000 over mill prices for 753 and a fraction tons of sheet steel.

He told the committee he had purchased steel "from self-styled brokers, junk men, and I have been offered a quantity of steel for purchase by a dentist."

He said many of the established steel companies formerly supplying his company had withdrawn as suppliers.

Shortage of Metals Holds Up Gun Factory's Program

Inability of the Naval Gun Factory at Washington, largest ordnance plant still in active operation, to compete with private industry for steel and other metals is delaying production of weapons, according to informed sources.

The gun factory, formerly the Washington Navy Yard, now has a work load extending over the next two years. Its products include guns, rockets, heads for V-2 rockets being fired experimentally in New Mexico, and various other prototype weapons.

A large user of aluminum, pig iron, sheet steel, bars, electrical equipment, bearings, chain and brass and bronze, the factory's current requirement of pig iron alone is 1,500,000 tons, or four months' consumption. Inability to obtain some of these items has delayed production as much as a year, it is said.

Due to statutory limitation on funds, the Navy is unable to enter the "gray market" and is under pressure on current contracts to include escalator clauses in behalf of private suppliers.

UPPING PRODUCTION by 50%

. . . Accuracy to ±.0005" at Cincinnati Bickford

New Bullard MAN-AU-TROL Spacers Eliminate Hole-Locating Jigs and Fixtures

Bullard 4"x 4" MAN-AU-TROL Spacer on 24" Cincinnati Bickford Super Service Box Column Upright...holes drilled, bored, reamed...accuracy of ± .0005" instead of former methods' ± .001"... production increased approximately 50%. Comparable results obtained with Bullard 30" x 20" Spacer.

Bullard MAN-AU-TROL Spacers now on production lines are more than living up to advance notices...eliminating jig costs, freeing men for more productive work, increasing volume and accuracy, reducing operators' fatigue. Write for the MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Conn.

BULLARD

CREATES NEW METHODS TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

General Motors "postpones indefinitely" projected Chevrolet light car program at Cleveland as result of building trades difficulties, soaring prices of new equipment and tooling, and high costs of construction materials

DETROIT

ALTHOUGH it was only a coincidence, the release of advance publicity on the machine tool show in Chicago this week all at almost identically the same time that General Motors' policy committee decided to "postpone indefinitely" the projected Chevrolet light car project at Cleveland served to counteract to a degree the black outlook which has been developing in the machine tool trade, which was further darkened by the GM postponement. A ray of hope had existed that the Chevrolet-Cleveland program might go through, but the continuing snarled position of the building trades, plus soaring prices of new equipment and tooling, not to mention the sour prospects for much improvement in availability of materials, persuaded GM top management the planned light car was hopeless.

The action is not regarded here as any indefinite postponement but rather as an outright cancellation of the entire deal. All orders for equipment, machinery and the like have been wiped off the books and if any resumption of the activity is to store, then a completely fresh start will have to be made. As a matter of fact, the program has been held in abeyance for so long, and there have been so many increases in prices in the meantime that even from a clerical standpoint the best policy was to wash it out for good.

Marketing Considerations Changed

When the Chevrolet light car was first proposed back in 1945, it looked like a good bet. There was no glut of used cars on the market to interfere with a new car priced around $800 which was the first figure mentioned. In past years, the principal obstacle to bringing out a low-priced, light-weight car was its destructive effect on the used car market. The war of course changed that picture and for the first time in history, the time looked really ripe for a venture into the field. One trouble was that a successful car of this type required re-engineering from the wheels up, both as to the product itself and the manufacturing methods to be used. Several hundred Chevrolet engineers set about the problem with their customary drive and enthusiasm. They bumped into one roadblock after another. Finally, the inability to come to even close to preliminary estimates on costs made it necessary to call a halt, after the expenditure of several hundreds of thousands of dollars.

Officially, General Motors has said practically nothing about the progress of the Chevrolet-Cleveland setup, beyond admitting there was such a thing, that Arnold Lenz was general manager and Howard Dingler—for a time, at least—was buyer. There was no announcement following the policy committee meeting, May 15, except in reply to newspaper inquiries. However, equipment interests were informed promptly and began consigning their correspondence and blueprints on Chevrolet-Cleveland to the dead files.

What will become of the work done thus far at the plant site in Cleveland, what will happen to the thousands of tons of structural steel already fabricated for the plant, and what will become of the personnel assigned to the development work are questions yet to be answered. As far as personnel is concerned, they can easily be absorbed back into the regular Chevrolet engineering and purchasing departments. Perhaps a sign might be erected on the plant property in Cleveland, reading, "A postwar dream that never came true."

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	442,242	140,738
April	449,228*	248,108
May	.....	247,620
June	.....	216,637
July	.....	331,000
August	.....	359,111
September	.....	342,969
October	.....	410,510
November	.....	380,664
December	.....	380,908
12 ms.	.....	3,268,456

* Preliminary.

Estimates for week ended:

May 3	101,690	67,060
May 10	94,756	71,355
May 17	82,881	48,565
May 24	85,000	53,569

Tool Show Draws Interest

The first big machine tool show in 12 years is bound to draw a large attendance from the automotive industry; in fact the present lack of interest in purchases of new machinery may be explained in part by the desire of master mechanics and production planners to mark time until they have had a chance to explore the 500,000 sq ft of exhibits which will fill building No. 4 of the Dodge-Chicago plant, Sept. 17-26. At the moment they are definitely not in a buying mood, except for occasional bargains obtainable from WAA surplus machine sales.

The machinery people are not particularly disturbed over the present lull. To many it is a welcome relief from the pressure of recent years. They know automotive buyers have always been interested in new tools that will do a better job for less money. The theme of the tool show itself has a recognizable automotive flavor—"more goods for more people at lower cost."

A number of WAA surplus tools had been earmarked for the Chevrolet-Cleveland plant, and by this time have doubtless been rerouted to other GM divisions. Some are known to have been consigned to the General Motors truck plant at Pontiac which has been in process of extensive modernization and expansion in the past two years, both in truck and coach divisions. A recent acquisition by this division was the entire equipment of a war surplus gage plant in the Cincinnati district.

Labor Turnover Drops

Turnover of production labor at the Ford Rouge plant in the past four months has dropped more than one-third, compared with average turnover last year. Average monthly rate of turnover based on separations and including layoffs of hourly personnel in the first four months of this year figures to 2.15 per 100 employees, a decline of 38.6 per cent from the rate of 3.5 per 100 employees in 1946. The Ford figure for 1946 is reported to be 20 per cent below the rate of 4.4 for all industry in Detroit, the latter figure not including layoffs.

Drop in the termination rate began in December and reached a low of 1.83 per 100 in January. The April rate was

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ASK NATIONAL AVIATION POLICY: Establishment of a national aviation policy by congressional action is being urged by industry spokesmen. Pictured here are, left to right: Robert E. Gross, president, Lockheed Aircraft Corp., Burbank, Calif.; Merrill Meigs, Chicago, former chairman, Aircraft Division of the War Production Board; and R. E. Gillmor, vice president, Sperry Corp., New York. They testified before the Senate Commerce Committee. NEA photo

back up slightly to 2.5 per 100. One reason contributing to the decline in terminations is the elimination of the former "mass production" hiring methods at the Rouge plant. The old, long hiring counter, where prospective employees were interviewed with little or no privacy has been ripped out, and job seekers are now seated before desks and interviewed leisurely. They are told as much as possible about the opportunities offered in the job classifications where they fit. After being hired, new employees in groups of five to 100 are welcomed into the company with a thorough explanation of opportunities, privileges and responsibilities, as well as a detailed exposition of the facilities of the Rouge plant. The Ford Rouge employment office added 1756 persons to the payroll in April out of 5410 applicants, in March 2189 out of 6816 applicants, and in February 2666 out of 7946.

W. B. Livingston Joins Ford

A recent newcomer to the Ford executive team is W. B. Livingston who will head all bus manufacturing operations. He is well known throughout the materials and parts industries from his long association with the purchasing department of General Motors Truck & Coach Division, formerly the Yellow Truck Coach Mfg. Co., and prior to that the Yellow Cab Mfg. Co., in Chicago, with which Mr. Livingston became associated in 1920. After being director of purchases until 1933, he was promoted to assistant to the president, then vice president and member of the board of directors, and finally executive assistant to the general manager. He is probably as familiar with the bus and coach manufacturing and distribution business as anyone in the country, and under his direction Ford bus operations should lunge ahead.

Public Relations Conscious?

A public relations effort is being urged on automobile dealers to establish in the mind of the average buyer what prices are on new cars now being sold legitimately, as contrasted with the hundreds of low-mileage used cars which are stated to be moving from lots at from $200 to $1000 over factory list prices. Dealers are being advised to start immediately to advertise local delivered prices, complete with accessories, so they may be compared with some of the fantastic figures at which slightly used cars are being offered.

Before doing this, it might be advisable to establish in the public's mind the fact that all dealers are willing to sell new cars exactly at factory list prices, to remove unwanted accessories and to offer reasonable prices for trade-ins, or n to make new car sales contingent upo trade-ins. From all information reachin this department, these would be difficu points to prove. On the score of acce sories, dealers uniformly shift the blam onto the factories which in turn say the are so rushed with getting out cars th they do not have time to "tailor" th accessories to each individual order. U fortunately, to many prospective auto mobile buyers, the whole automotive re tailing business is beginning to smell high heaven, and their recriminations e tend all the way back to the manufa turing plants.

Luxemburg Provides Market

Substantial market for American auto motive products is reported in the Gran Duchy of Luxemburg where no ne cars were available for replacement purchase from Jan. 1, 1940, until late 1945, the Department of Commerce re ports.

Automotive vehicles brought into th Grand Duchy from abroad have bee under a rationing and priority syste handled by the Ministry of Transpor Of the 494 new automotive vehicles sol in 1946, 216 were from France, 17 from the United States, 103 from Gre Britain, and 2 from Sweden.

Luxemburg's small amount of dolla exchange in the United States is one the difficulties.

Model "Train of Tomorrow"

A recent achievement of artists an craftsmen in the General Motors stylin section here is a 63-foot model of th corporation's "train of tomorrow" whic shortly will roll out of shops of Pullma Standard Car Mfg. Co. in Chicago f its maiden journey around the countr The model, said to have cost approx mately $80,000, is amazing for its a curacy of detail and lifelike appearanc Its cars are peopled with 175 cl models of men, women and children ar are completely outfitted with furnitur fixtures, appointments—even dining c tables with food, dishes, glasses and on down to tiny packs of cigarettes.

Principal feature of the four cars their much-publicized astra-dome desi —a glass and steel observation de rising from the roof level and accomm dating a score or more of passengers. T model, faithful in every detail down magazine racks filled with doll-size mag zines, has been on display in New Yo and Chicago and now is set up in t General Motors Building here. The tra itself is expected in Detroit early ne month, opening a six-months nation tour.

VICKERS HYDRAULIC EQUIPMENT

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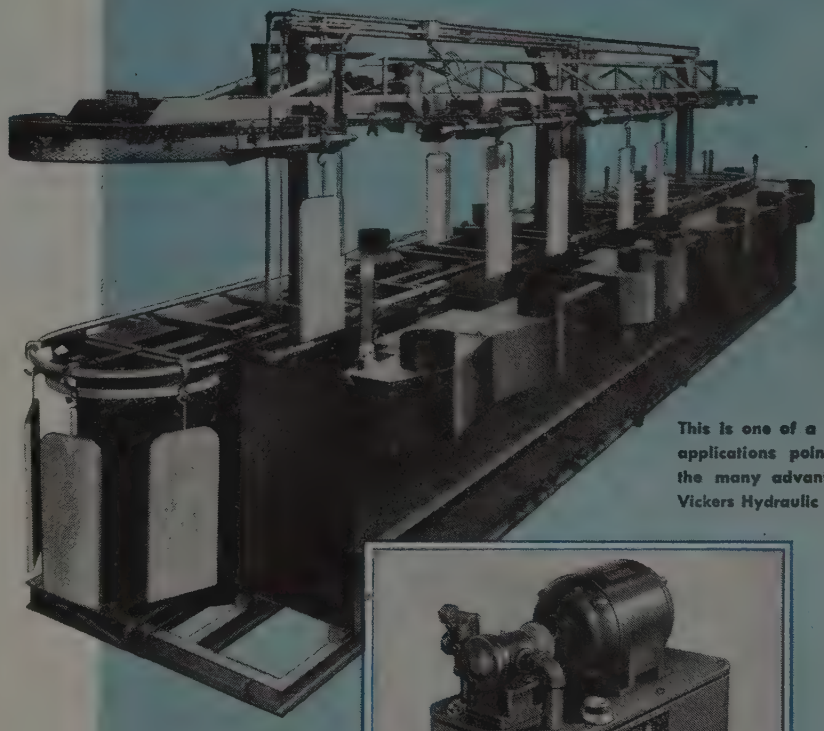
HIGH PRODUCTION
SPACE ECONOMY
UNIFORM QUALITY

IN *Udylite* AUTOMATIC PLATING MACHINE

s Udylite machine does a complete ating job automatically . . . taking ch part through seven tanks and a ying chamber . . . timing exactly the erval in the various solutions for aning, plating and rinsing.

ch part (or rack of parts) is auto- tically lowered into each of the seven ks in turn—then lifted out and trans- red to the next tank. This might be ne with a multiple dip conveyor. But conveyor slants permissible in vering and raising in that way re- re extra tank length.

ylite made the machine far more mpact—saving 18″ to 24″ in the gth of each tank—by using Vickers draulic Equipment to raise and lower entire conveyor assembly at each nsfer. By this means, each piece (or k) is lifted straight out of the tank, ved over the next tank and lowered ight down. This provides better aning and more uniform plating— ter drainage and less contamination the solutions.



This is one of a series applications pointing the many advantages Vickers Hydraulic Control

Above: Elevated position for transfer from one tank to the next.

Vickers Hydraulic Power Unit.

Vickers Hydraulic Power Unit and Control Valves have ny advantages for such applications: (1) proven depend- lity, (2) accurate control and precise timing, (3) flexibility of trol to suit varied production requirements, etc.

versdtile features of Vickers Hydraulic Equipment on this type of application, as on many other industrial installations, have made possible increased production, improved product quality, greater safety, and lessened physical demands upon labor while increasing its productivity. Vickers Application Engineers will gladly discuss your individual control problems.

VICKERS Incorporated

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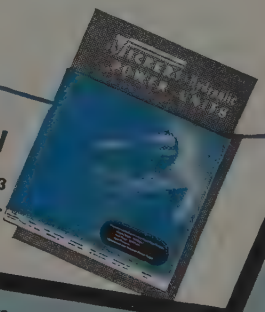
New BULLETIN

Write for Bulletin 46-43 describing Vickers Hydraulic Power Units.



IGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Foreign Students Tour Plant of W. & L. E. Gurley

Instrument manufacturer is host at plant visit and dinner for Rensselaer Polytechnic's Chinese students.

TO ACQUAINT foreign students studying at Rensselaer Polytechnic Institute with American manufacturing methods, W. & L. E. Gurley, Troy, N. Y., manufacturer of scientific and surveying instruments, has begun a program of plant tours and dinner discussions.

The first group of students to be conducted through the Gurley plant were Chinese and were addressed at a dinner preceding the tour by Z. T. Tsang, president, Chun Ho Co. Ltd., Shanghai, China, exclusive agent for the Gurley's line of instruments in China, and by Sydney Tsai, export manager of the company.

Pointedly, Mr. Tsai told the students, "we should feel ashamed of ourselves that our forefathers made the history and we failed to glorify their unfinished work and lead the world in the manufacture of astronomical instruments, at least."

Both speakers agreed that importation of greater numbers of scientific instruments into China would help that country in its efforts toward industrialization. At the present time, they said, only the universities and a few institutions are using such devices.

A second group of foreign students at R. P. I. will be guests of W. & L. E. Gurley in the near future.

Lester C. Higbee, sales manager of W. & L. E. Gurley, Troy, N. Y., manufacturer of scientific and surveying instruments, shows Z. T. Tsang and Sydney Tsai, representatives of the Chun Ho Co. Ltd., Shanghai, importers and exporters, a telescope solar transit. Chun Ho Co. is Gurley's exclusive agent in China

National Cylinder Gas Buys Two South American Firms

National Cylinder Gas Co., Chicago, manufacturer of industrial gases and welding equipment and supplies, has acquired Gases Industriales de Venezuela C. A. and has purchased an interest in Gases Industriales de Colombia C. A., makers of oxygen and acetylene gases.

This step marks a new stage in the company's general expansion program which during the past year has extended operations within the United States by acquiring oxygen producing plants in Seattle and Portland, Oreg., increasing facilities in five midwestern and southern cities and constructing a new acetylene plant at Kansas City, Mo. Two new plants, at Lubbock, Tex., and Memphis, Tenn., have been recently completed, and another facility at Columbus, O., is under construction.

Fitzsimons Name Altered To Fitzsimons Steel Co.

All American Industries Inc., New York holding company, has changed the name of the recently purchased Fitzsimons Co., Youngstown, cold-drawn steel producer, to Fitzsimons Steel Co. No change is contemplated in sales representation or general policies of Fitzsimons, although increased production facilities are planned.

W. A. Lampe, who represented the old company for 20 years, will continue in the same capacity with the new company at the Cleveland district office. John Metcalf has been appointed general manager of the Youngstown facilities.

All American also owns Oklahoma Steel Castings Co., Tulsa, Okla., and is currently negotiating for additional acquisitions in the steel industry. President of the New York company is Robert C. Hardy, partner, Wilkie-Owen-Otis-Farr & Gallagher.

Bridgeport Brass To Make Strip, Tubes at Indianapolis

Bridgeport Brass Co., Bridgeport, Conn., plans to produce heavy and light-gage brass strip, copper water tubing for plumbing and heating applications and miscellaneous tubing for fabrication at the plant in Indianapolis it recently acquired from War Assets Administration.

Designed originally for production of heavy-gage strip, the plant was operated by Bridgeport during the war. The company is now re-equipping the facility for its peacetime products. The 90-acre property, built in 1941, contains a group of buildings which comprise more than 817,000 sq ft of floor space. These include a casting shop, rolling mill and rod mill as well as complete laboratory facilities.

Form New Group in Society Of Lubricating Engineers

Northern California Section of the American Society of Lubricating Engineers has been organized. Monthly meetings are planned at the Officers' Club, Treasure Island, San Francisco. Secretary-treasurer of the group is L. W. McLennan, Union Oil Co. of California, Oleum, Calif. Wilbur Deutsch, 636 Potrero Ave., San Francisco, is chairman.

This is the tenth section to be formed since the society's organization almost three years ago. Others are at Buffalo, Chicago, Cleveland, Detroit, Los Angeles, Milwaukee, New York, Philadelphia and Pittsburgh.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Wellman Bronze & Aluminum Co., Cleveland, has purchased for $195,000 the government-owned magnesium and castings plant at 2225 E. 93rd St., Cleveland. Wellman operated the plant during the war.

—o—

Technical Societies Council of New York, comprised of 14 engineering and technical societies in the metropolitan area, has been incorporated with H. C. R. Carlson, of the American Society of Mechanical Engineers, as president. Organization seeks to advance engineering, scientific and technical knowledge and to further high professional standards.

—o—

Saylor Electric Products Corp., Detroit, manufacturer of flexible conduit for the electrical construction industry, has opened a plant in Glendale, Calif.

—o—

Standard Machine Works, Pasadena, Calif., is retooling for manufacture of small diesel engines of 1½ to 5 hp. Heretofore the firm has been primarily a maker of aircraft parts. Substantial production of the diesel engines is expected in about six months.

—o—

Great Western Corp., manufacturer of trailer coaches, has leased 20,000 sq ft of plant space at N. Santa Cruz and Saratoga Aves., Los Gatos, Calif.

—o—

Youngstown Sheet & Tube Co., Youngstown, will hold open house May 28 at its tin mill and steel plant in Indiana Harbor, Ind.

—o—

Ampco Metal Inc., Milwaukee, manufacturer of castings and forgings, has licensed J. B. Ripley Brass Foundry, Windsor, Vt., to produce and sell Ampco's metal alloy castings in Vermont and New Hampshire.

—o—

War Assets Administration, Seattle, has sold the surplus Wilkeson coal mines and coke plant at Tacoma, Wash., to R. E. Randall, Seattle, for $600,000. Plans are for active operation to supply local coke demand.

—o—

Playboy Motor Car Mfg. Corp., Buffalo, announces arrangements with Continental Motor Corp. for motors, together with previous contracts made for tire and steel deliveries, complete the firm's production plans for this year and next.

—o—

National Electrical Manufacturers Association, Chicago, has published its rule book and entrant's guide for a competition on industrial, commercial and school lighting applications. Copies may be obtained from the Merit Award Committee, 326 W. Madison St.

—o—

Meehanite Metal Corp., New Rochelle, N. Y., has contracted with Builders Iron Foundry, Providence, R. I., for the manufacture of castings from Meehanite's alloy metal.

—o—

Magnavox Co., Ft. Wayne, Ind., radio manufacturer, will close all office and factory operations from June 27 to July 14 for summer vacations.

—o—

Peerless Pump Division, San Jose, Calif., Food Machinery Corp., has started installing equipment in the former Atkins Ordnance plant, Indianapolis, which it purchased recently from WAA for $861,000. Production of shallow well pumps for household water systems will begin soon.

—o—

Buckingham Products Co., manufacturer of polishing and buffing compositions, has moved to 14100 Fullerton Ave., Detroit, which has double the producing area of the old plant.

—o—

Container Corp. of America has purchased for $125,000 a plant it has occupied at 6541 Eastern Ave., Baltimore.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of U. S. Steel Corp., rolled 1447 tons of structural shapes on April 13 at its Clairton, Pa., plant, shattering all records made since the mill was built in 1905. A previous record figure of 1335 tons had been rolled on May 13, 1942.

—o—

Sylvania Electric Products Inc., New York, announces that a survey it has made reveals that the average retail price per radio set has declined from $55.70 in 1936 to $54.52 in 1946.

—o—

All-State Welding Alloys Co. Inc., White Plains, N. Y., announces immediate availability of a paste cast iron flux for gas welding, one of whose features being that it can be applied while the casting is still cold.

—o—

War Assets Administration, Chicago, will receive bids until June 30 for purchase or lease of the $11,500,000 plant in Chicago built in 1942 and operated during the war by Revere Copper & Brass Co. Land, buildings and equipment originally cost the government $11,575,185.

—o—

Western Electric Co. Inc., New York, has taken a long-term lease on a five-story warehouse at 3615 Iron St., Chicago.

—o—

Askania Regulator Co., Chicago, has leased for ten years a four-story building at Fairbanks Ct. and Ontario St. The 100,000 sq ft of floor space will be used for showrooms, offices and assembly of Askania's line of control systems.

—o—

Francis Co., engineering and designing, has moved into new offices at 222 N. Michigan Ave., Chicago.

—o—

U. S. War Department will open bids on June 5 at Watervliet Arsenal, Watervliet, N. Y., for 500 army tanks. Weighing approximately 20 gross tons each, the tanks will be sold for scrap only.

—o—

Hotpoint Inc., Chicago, affiliate of General Electric Co., has begun production of a ten cu ft refrigerator that occupies approximately the same floor space as the eight cu ft model.

—o—

Remington Rand Inc., Buffalo, has released a sound motion picture in color which describes its unit invoice accounting plan that speeds and facilitates receivable procedures.

—o—

American Steel & Wire Co., Cleveland, subsidiary of U. S. Steel Corp., has developed an insulated "self-supporting" type overhead cable which no longer makes it necessary to prune holes in shade tree foliage to reduce friction on electric lines passing through them.

—o—

Pullman-Standard Car Mfg. Co., Chicago, has announced that its shop at Bessemer, Ala., will be producing 50 cars daily by next month, or three times its 1946 rate.

—o—

Houdaille-Hershey Corp., Detroit, manufacturer of automotive products, has had a sales average of over $5 million a month this year. The company said steel is the most difficult of raw materials to obtain.

—o—

General Electric Co., Schenectady, N. Y., announces its 45-ton, 300-hp diesel-electric locomotive used in speeding freight car line production at the St. Louis plant of the American Car & Foundry Co. has over a period of three years realized higher line production with greater safety than the 90-ton steam engine it replaced.

The Business Trend

Industrial Production Rate Declines Slightly

MIXED TRENDS in various industries pretty well balanced one another in the week ended May 17, although the net result was a slight decline in over-all industrial production, lowering STEEL's industrial production index to 155 per cent (preliminary) of the 1936-1939 average. This marked the third consecutive week the index has receded. In the week ended May 10 it had been 156 per cent.

STEEL—Continuing to show recovery from labor difficulties, steel ingot production is returning toward the postwar high mark of 97 per cent of capacity set late in March and early in April. Meanwhile, consumer pressure for finished steel products, particularly sheets, continues unabated.

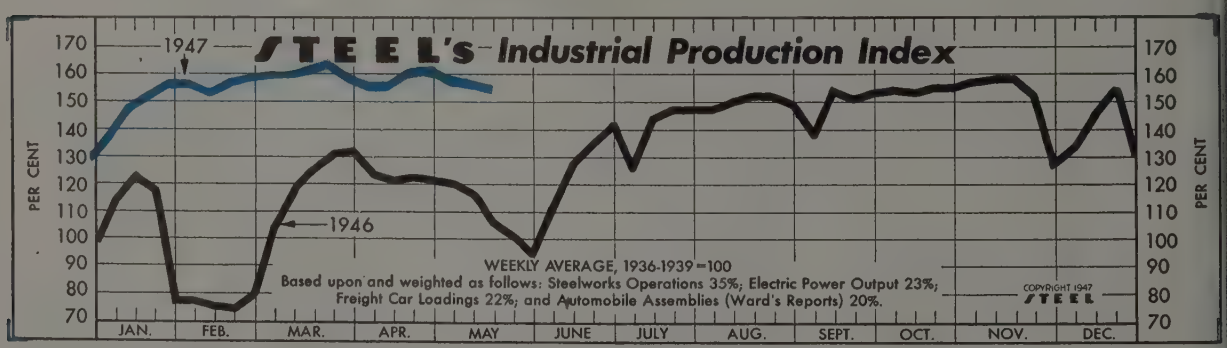
AUTOS—Lowest output of automobiles since mid-January was recorded in the week ended May 17 when production of passenger cars, trucks and busses aggregated an estimated 82,881 units. This marked the fourth consecutive week auto output had declined. The production drop is the result of an insufficiency of sheet steel, and in automotive circles it has been predicted this scarcity will continue to hamper auto producers into the last quarter of 1947.

COAL—Estimated production of 13,045,000 net tons of bituminous coal in the week ended May 10 is the highest attained since the week ended Mar. 15. Even though coal output was impeded earlier this year by work stoppages it was not so seriously affected as in the early part of 1946, with the result that 1947 production through the week ended May 10 was 59,963,000 tons, or 36.2 per cent, ahead of that for the corresponding period of 1946.

PETROLEUM—For the first time in history, average daily crude oil output passed the five million barrel mark by reaching 5,004,600 barrels a day average in the week ended May 10. Previous record had been an average daily production of 4,960,000 barrels in the week ended June 15, 1946. New record in the week ended May 10 was reached after production had shown an upward trend all this year. Oil industry experts believe the daily production figure should continue to run at about the five million figure for the rest of the year to meet the record demand.

PRICES—After five weeks of decline, the wholesale price index of the U. S. Bureau of Labor Statistics remained unchanged in the week ended May 10. At 146.7 per cent of the 1926 average, the bureau's index was 0.9 per cent below a month ago but 33.2 per cent above the corresponding week last year.

CONSTRUCTION—Reflecting the repressive effects of high costs, construction contracts awarded in the 37 states east of the Rocky mountains in April fell 18 per cent below the volume reported for the corresponding month of last year. The F. W. Dodge Co., New York, reported the total contract volume was $602,338,000, a gain of less than 1 per cent over March.



The Index (see chart above): Latest Week (preliminary) 155 | Previous Week 156 | Month Ago 161 | Year Ago 106

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	94.5	92.0	95.5	49.0
Electric Power Distributed (million kilowatt hours)	4,616	4,653	4,660	3,939
Bituminous Coal Production (daily av.—1000 tons)	2,174	2,095	1,175	77
Petroleum Production (daily av.—1000 bbl.)	5,008	5,005	4,912	4,751
Construction Volume (ENR—Unit $1,000,000)	$131.3	$95.2	$110.1	$137.8
Automobile and Truck Output (Ward's—number units)	82,881	94,756	105,337	48,565

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

TRADE

Freight Carloadings (unit—1000 cars)	880†	884	866	688
Business Failures (Dun & Bradstreet, number)	88	98	68	16
Money in Circulation (in millions of dollars)‡	$28,134	$28,197	$28,163	$27,950
Department Store Sales (change from like wk. a yr. ago)‡	+13%	+12%	−6%	+40%

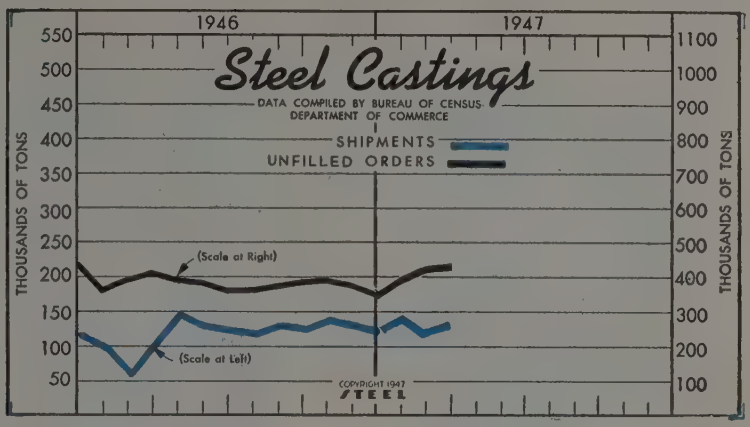
† Preliminary. ‡ Federal Reserve Board.

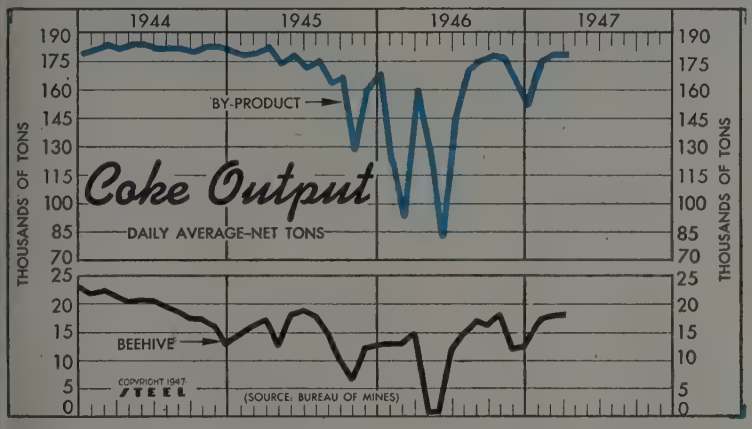
Commercial Steel Castings

(Net tons in thousands)

	Shipments		Unfilled Orders*	
	1947	1946	1947	1946
Jan.	139.0	102.5	365.5	359.5
Feb.	125.6	60.6	421.4	387.2
Mar.	134.9	104.5	434.9	406.4
Apr.	....	146.6	....	384.7
May	....	130.8	....	374.2
June	....	121.5	....	354.4
July	....	117.5	....	356.8
Aug.	....	129.7	....	373.7
Sept.	....	126.5	....	380.6
Oct.	....	137.3	....	384.1
Nov.	....	130.6	....	372.1
Dec.	....	123.9	....	362.8

* Castings for sale.





Coke Output

Bureau of Mines

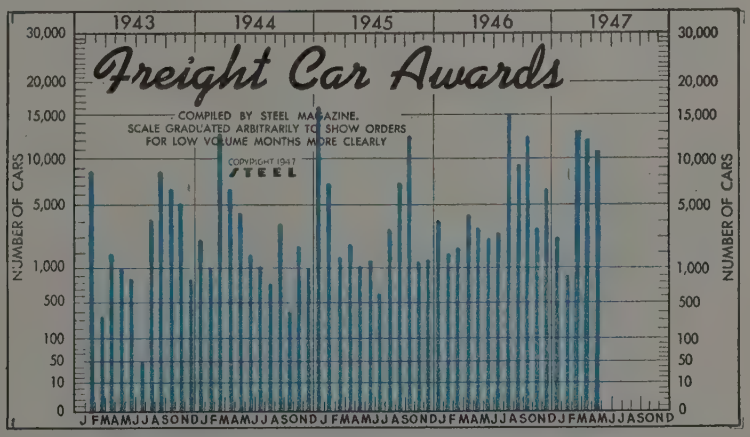
(Daily Average—Net Tons)

	By-Product		Beehive	
	1947	1946	1947	1946
Jan.	181,245	122,570	18,124	13,093
Feb.	183,189	93,985	18,372	13,140
Mar.	182,529	161,290	18,696	14,962
Apr.	.....	128,394	.....	713
May	.....	83,019	.....	869
June	.....	147,272	.....	12,218
July	.....	171,703	.....	15,105
Aug.	.....	176,195	.....	16,892
Sept.	.....	178,156	.....	16,167
Oct.	.....	177,817	.....	17,954
Nov.	.....	164,165	.....	12,028
Dec.	.....	153,826	.....	12,302
Ave.	.....	146,877	.....	11,991

Freight Car Awards

	*1947	*1946	1945	1944	1943
Jan.	9,905	1,500	7,200	1,020	8,365
Feb.	13,727	2,403	1,750	13,240	350
Mar.	12,049	4,512	2,500	6,510	1,935
Apr.	11,331	3,764	1,120	4,519	1,000
May	.....	3,025	1,526	1,952	870
June	.....	3,335	670	1,150	50
July	.....	14,836	3,500	795	4,190
Aug.	.....	9,629	7,240	3,900	8,747
Sept.	.....	12,768	12,840	400	6,820
Oct.	.....	3,407	1,320	2,425	5,258
Nov.	.....	6,707	1,650	1,065	870
Dec.	.....	3,041	4,116	16,245	2,919
Total	.....	68,927	45,432	53,221	41,374

* American Railway Car Institute.


1943
1944
1945
1946
1947
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1947 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,188	$12,865	$12,066	$11,289
Federal Gross Debt (billions)	$257.7	$257.7	$258.0	$273.0
Bond Volume, NYSE (millions)	$21.7	$16.3	$23.9	$18.7
Stocks Sales, NYSE (thousands)	6,138	3,703	6,966	5,948
Loans and Investments (billions)†	$55.0	$55.3	$54.9	$64.1
United States Gov't. Obligations Held (millions)†	$34,544	$34,745	$34,296	$45,777

† Member banks, Fedoral Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$63.54
All Commodities†	146.7	146.7	148.1	110.1
Industrial Raw Materials†	160.1	159.4	163.4	123.2
Manufactured Products†	141.9	142.2	142.0	105.6

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

JOHN P. STUTSMAN

FRANK D. HAZEN

W. R. ELLIOT

John P. Stutsman has been appointed director of industrial relations of the affiliated Shenango Furnace Co., Pittsburgh, and Shenango-Penn Mold Co., Dover, O. He had been connected with the Rio Grande Fuel Co., Denver, and the Group Department of the General American Life Insurance Co., and, for the past six years, was a special agent for the Federal Bureau of Investigation.

—o—

H. Webster Stull has been appointed director of personnel for the Mathieson Alkali Works Inc., New York. He had been head of the Mathieson legal departments, handling labor contract negotiations.

—o—

Paul K. Addams has been elected president of Fitzgibbons Boiler Co. Inc., New York, succeeding his father, **Homer Addams**, who continues as chairman.

—o—

R. W. Kerr, formerly vice president and treasurer, Plomb Tool Co., Los Angeles, has been elected executive vice president. **H. C. Baumgartner**, formerly secretary and comptroller, has been named secretary and treasurer. Other officers confirmed by the company include: **M. M. Mautner**, vice president in charge of industrial relations; **C. W. Coslow**, vice president in charge of manufacturing; **F. C. Robbins**, vice president in charge of research and development; and **J. P. Danielson**, vice president in charge of the J. P. Danielson Division.

—o—

Harry S. Rose, formerly sales manager, Progressive Welder Co., Detroit, has been named to head the new sales and sales engineering offices, located in the Maccabees Bldg., Detroit. This new office, previously located at the Progressive plant, will be known as the Progressive Welder Sales Co. Associated with Mr. Rose will be **Douglas K. Renny** and **Douglas I. Harris**, both connected with the Progressive Welder Co. for many years in engineering sales and service, and **Thomas J. Crawford**, welding consultant.

—o—

Frank D. Hazen, general sales manager, industrial department, American Arch Co. Inc., New York, has been appointed vice president and general manager of the department, with headquarters in Pittsburgh. He has been associated with the company for 22 years.

—o—

Charles J. Boyle, recently in the Sales Division, U. S. Steel Export Co., New York, and before the war in the open-hearth department of Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel subsidiary, is now associated with Steel Trading Corp., Pittsburgh.

—o—

Howard S. Thompson, manager of pressed steel sales, Commercial Shearing & Stamping Co., Youngstown, has been promoted to assistant vice president in charge of sales promotion. **John E. Wallis**, assistant manager of pressed steel sales, has been promoted to manager of pressed steel sales.

—o—

Morehead Patterson, chairman of the American Machine & Foundry Co., New York, has been elected to the additional post of president to succeed **Herbert H. Leonard**, who has been elected chairman of the executive committee. **George Hills** has been elected general counsel.

—o—

Robert H. Binkerd has been appointed purchasing agent of the Alco Products Division, American Locomotive Co., New York. He will have headquarters in Dunkirk, N. Y. **Henry Newman**, who has served as foreman of the gunshop tool room in Dunkirk, has been promoted to foreman of both the gunshop and machine shop tool departments.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, has announced the following changes in personnel at the company's Otis Works at Cleveland: **W. R. Elliot**, formerly assistant general superintendent, has been promoted to general superintendent. **E. N. McKelvey**, formerly superintendent of the Lakeside Division of the Otis Works, has been appointed assistant to the general superintendent of the works, succeeding **F. W. Mumper**, who has been transferred to the general offices of J & L as personnel and industrial relations director.

—o—

William C. Kitto, superintendent, Steel Division, Pittsburgh Steel Co., Monessen, Pa., has been elected chairman of the National Open Hearth Steel Committee, American Institute of Mining & Metallurgical Engineers. He succeeds **E. L. Ramsey**, superintendent, steel production, Wisconsin Steel Works, Chicago. **C. R. FonDersmith**, former chairman of the Southern Ohio section of the National Open Hearth Steel Committee, has been elected vice chairman of the national committee, and **Ernest Kirkendall**, secretary-treasurer.

—o—

Dr. Lester A. Pratt, general sales manager, Merrimac Division, Monsanto Chemical Co., St. Louis, has been appointed assistant to the division general manager. Division general manager, **J. P. Rutter**, announced that the appointment coincides with the naming of Mr. Pratt, by trustees of the company, as president, general manager and trustee of the New England Alcohol Co., a Monsanto subsidiary at the Everett, Mass., plant. Mr. Pratt has served as vice president and

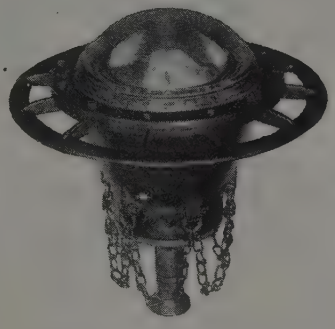
HARPER fastening NEWS

"SEEING EYES" for SEA-DROMES

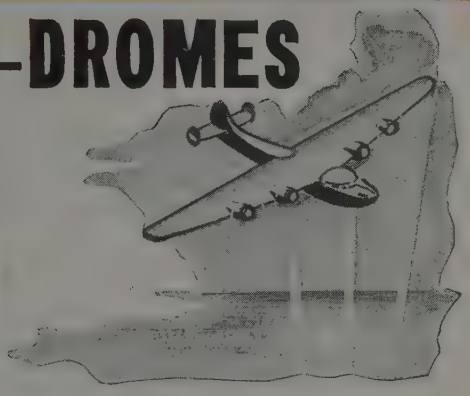
Utilize Harper Silicon Bronze Bolts

At a time when safety in commercial flying has become a primary consideration to airlines, government and the flying public a well-known manufacturer of lighting equipment has come forward with a clever solution to at least one of the pressing problems —sea-drome landings at night. Lighting of water areas is difficult particularly in connection with aircraft takeoffs and landings where the judgment of altitudes and depths is of paramount importance. Water surfaces are ever changing from glassy smoothness to heavy chop, preventing consistent lighting from above.

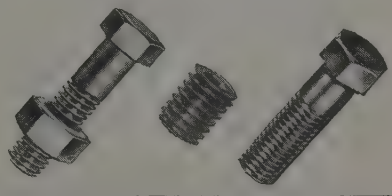
Hence the development of these underwater flood lights which are



anchored about eight feet beneath the surface of the water and present to the incoming pilot a clear, non-glare landing path unaffected by the condition of the water surface, yet the light is of such character that he can detect that condition and make due allowances.



Harper Silicon Bronze Bolts which are strong, durable and resist sea water corrosion are specified in these Navy-approved units.



POWER UNIT SUBMERGES IN UNIQUE DEEPWELL PUMP

One of the most efficient pumps yet devised for deepwell water supplies, dewatering and other similar uses is a submersible turbine type produced by a large western manufacturer. It is designed on the principles of the first deepwell turbines but ingeniously contrives to carry its power source under water with the pumping unit. This overcomes the drawback of the older type receiving its power from the surface through a whirling shaft which cannot follow the contours of an offset well and is limited in depth of operation.

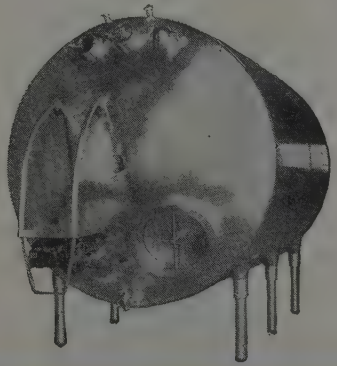
The "Submersible" motor is completely sealed in a steel case and close-coupled to the turbine pump. A minimum of surface housing is required.

Common metal fastenings originally employed in this unit proved unsatisfactory against corrosive fluids. Later, this problem was solved by the installation of Harper Stainless Steel bolts.

STAINLESS A "MUST" IN MILK HOLDING TANKS

Rigid rules of sanitation set down for the dairy industry require that all surfaces which come into contact with milk be faultlessly free from bacteria-breeding flaws. Materials which corrode to produce pitted surfaces or contours which prevent thorough cleansing cannot be tolerated.

Through exhaustive tests Type 302 stainless steel has been found an excellent material for fabrication of the carefully designed tanks such as the milk holding tank illustrated here. It resists corrosion by lactic acid, offers high strength and takes a smooth, clean polish. Manufacture of 302 stainless studs, set screws and hexhead bolts used in this tank, however, is difficult and requires special know how and equipment . . . the knowledge and facilities which are "stock in trade" at the H. M. Harper Company.



The H. M. HARPER COMPANY
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Branch Offices—New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas.

HARPER *Chicago*

HARPER SPECIALIZES IN EVERLASTING FASTENINGS

general sales manager of the New England Alcohol Co., since 1942. He is succeeded as general sales manager of the Merrimac Division by **Howard J. Heffernan. Frederick S. Hatch,** assistant to the division general manager, has been elected vice president of the New England Alcohol Co.

—o—

David M. Goodrich, chairman of the board, B. F. Goodrich Co., Akron, has been re-elected to the board of directors of the National Industrial Conference Board.

—o—

Alvin Haas, formerly president, Yates-American Machine Co., Beloit, Wis., has become associated with the Cottom Engineering Corp., Geneva, Ill., in a management capacity.

—o—

William J. Peltz has been appointed to the executive staff of Philco Corp., Philadelphia.

—o—

John B. Ives has been appointed manager of operations, Laclede-Christy Clay Products Co., St. Louis. He will have complete charge of the manufacturing and mining operations of the St. Louis and Toledo, O., plants and mines.

—o—

H. E. Ryker, vice president of manufacturing, Lockheed Aircraft Corp., Burbank, Calif., has been elected a director of the company to fill a vacancy created by the resignation last year of **R. C. Walker.**

—o—

Earl R. Olson, chemical engineer, has been named to the staff of Battelle Memorial Institute, Columbus, O., where he will engage in research on the engineering properties of materials.

—o—

J. A. Baldinger has been named assistant to the general manager, Automatic Transportation Co., Chicago. He had been assistant sales manager of the company's Truck Division. Previous to his service in the Navy during the war, he had been connected with the Whiting Corp., Harvey, Ill.

—o—

William F. Hosford has resigned as director and vice president in charge of operations, Western Electric Co. Inc., New York, after being associated with the company 47 years. **Stanley Bracken,** vice president in charge of manufacture, has been elected executive vice president, and is succeeded by **H. C. Beal,** formerly engineer of manufacture. **F. J. Feely** succeeds Mr. Beal, and continues as manager of the company's Buffalo shops and Electronics shops.

—o—

Irby L. O'Brien has been appointed assistant general traffic manager, Monsanto Chemical Co., St. Louis.

—o—

Vincent J. Calise has joined Liquid Conditioning Corp., Linden, N. J., as technical manager.

—o—

Leroy F. Marek has been elected vice president, Arthur D. Little Inc., Cambridge, Mass. He has been in charge of the company's chemical engineering activities for several years past.

—o—

James Cunningham has joined the recently expanded mechanical service department of the Ohio Equipment Co. Inc., Cleveland.

—o—

Carl J. Linxweiler has been appointed sales manager of the Threadwell Tap & Die Co., Greenfield, Mass. He has been sales manager of the Machine Tool Division of the Sheffield Corp., Dayton, O., of which the Threadwell Tap & Die Co. is a wholly owned subsidiary.

—o—

Walter F. Wright, for many years associated with the automotive and parts industries, is now representing Jack & Heintz Precision Industries, Bedford, O., and the Burgess Co., Cleveland, on subcontracting work in the Detroit area. During the war he served on the administrative staff of the Detroit branch of WPB.

—o—

George M. Schurman, president and treasurer, National Bag Corp., New York, has been elected a director of American Brake Shoe Co., New York.

—o—

Thomas H. Beacom, vice president in charge of the trust department, First National Bank of Chicago, has been appointed a director of the Stewart-Warner Corp., Chicago. He succeeds **Robert J. Dunham,** retired.

—o—

Verdie A. Dodds has been elected president, Brown-Wales Co., Boston. He succeeds **Quincy W. Wales,** who has been elected chairman of the board. **Guilbert Q. Wales** has been elected vice president, and **Andrew Wales,** assistant treasurer.

—o—

W. E. Jones, chief engineer, Stockham Pipe Fittings Co., Birmingham, has been elected chairman of the Birmingham district chapter, American Foundrymen's Association. He succeeds **Tom H. Benners Jr.** Other officers elected are: **Dr. James T. MacKenzie,** vice chairman, and **Fred K. Brown,** secretary-treasurer.

—o—

J. W. Angell has been appointed to the post of marketing manager of the Signode Steel Strapping Co., Chicago. He had been assistant to the vice president and sales director. His new duties include supervision of market research, advertising and sales promotion.

—o—

Niles C. Bartholomew has been appointed industrial engineering director of the Carborundum Co., Niagara Falls,

J. A. BALDINGER

CARL J. LINXWEILER

J. W. ANGELL

DISSTON CARBON TOOL STEELS

"BEST"
"EXTRA"
"STANDARD"

Made in electric furnaces by accurately controlled melting practice, from carefully selected materials, and with expert supervision during every process.

DISSTON "BEST"

A carbon Tool Steel that is all that its name implies. On hardening, core can be kept soft and tough with full hardness on outside. Various depths of case, at any given heat-treating temperature, can be produced. And all factors, such as grain size, coarsening temperature, toughness and hardness of case, etc., can be controlled. Will be melted to individual user's carbon and/or Silicon specification, and, if desired, with small percentages of Chrome.

All Disston "BEST" Tool Steel must pass these tests: (1) microscopic, for cleanliness, (2) depth of hardness, according to specifications, (3) hardenability in a cone section, (4) deep acid etch for internal soundness, and (5) step-down test to show freedom of splits, seams or dirt at any depth.

DISSTON "EXTRA"

A fine quality Carbon Tool Steel that is indicated where a good, clean grade of steel with specified depth of hardness is required, but where the amount of work put on the steel or the subsurface cleanliness are not so great as to warrant the extra cost of Disston "BEST". Widely accepted for applications such as heading dies, blanking dies, punches and similar tools made in quantities, and where price is a factor. Usually stocked in the 1.00 to 1.10% Carbon range with Phosphorous and Sulphur .020%.

Tested before shipment for (1) microscopic cleanliness and homogeneity, (2) depth of hardness, (3) hardenability, and (4) deep acid etch.

DISSTON "STANDARD"

A good quality Carbon Tool Steel that is entirely suitable for the regular line of competitively priced hand and machine tools where depth of hardness is not an important factor. It is fine grained, medium hardening and clean. After heat-treatment, it shows a high degree of fatigue-resistance and a high elastic limit. May be specified in any Carbon range, but is usually stocked in .95 to 1.05%, with Phosphorous and Sulphur .020% maximum. Subjected to routine tests for surface condition and acid etch of ends of bars.

DISSTON metallurgists and engineers will be glad to help you solve any of your tool steel problems. Write for particulars.

STEEL: Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

HENRY DISSTON & SONS, INC., 526 Tacony, Philadelphia 35, Pa., U. S. A.

N. Y. Prior to joining Carborundum, Mr. Bartholomew had been manager, television tube plant, Corning Glass Works, at Charleroi, Pa.

—o—

Robert L. Ziegfeld has been elected acting secretary and treasurer of the Lead Industries Association. **K. C. Brownell** has been elected vice president, member of the executive committee and board of directors. **D. N. Burruss Jr.**, has been elected to the board of directors.

—o—

Harold C. Lumb has been named assistant general counsel for Republic Steel Corp., Cleveland. He previously had been associated with the Cleveland law firm of Jones, Day, Cockley & Reavis.

—o—

American Foundrymen's Association has announced admission to membership of six Birmingham foundry executives and technologists. They are: **H. S. Williams**, J. H. Zehmer Co.; **R. L. Lock**, Anderson Brass Works Inc.; **Fred C. Barbour**, McWane Cast Iron Pipe Co.; **J. J. Lally**, Caldwell Foundry & Machine Co.; **Richard M. Schmidt**, American Cast Iron Pipe Co.; and **James R. Reynolds**, Hill & Griffin Co.

—o—

Giles C. Hoyt and **Gen. Levin H. Campbell Jr.** have been elected executive vice presidents of International Harvester Co., Chicago. Other changes in the company's management include: **William E. Worth**, formerly executive vice president, has retired after 27 years' service with the company. **Robert P. Messenger**, formerly vice president in charge of Farm Implement Division, has been named to succeed Mr. Hoyt as vice president in charge of foreign operations. **Ralph C. Archer**, formerly vice president in charge of the Farm Tractor Division, has been named to succeed Mr. Messenger, and is in turn succeeded by **Michael J. Graham**, formerly assistant to the vice president in charge of manufacturing.

—o—

B. C. Franklin, retired president, Western Automatic Machine & Screw Co., Elyria, O., has been elected president of the Couch-Uthe Co., Elyria.

—o—

W. L. Byler has been named advertising manager, Peabody Engineering Corp., New York.

—o—

James M. Stuart has been named product manager for the newly established Ingot Division, Reynolds Metals Co., Louisville. His headquarters will be in Louisville.

—o—

G. W. Wallace, chief chemist in charge of development and refinery laboratories, Freedom-Valvoline Oil Co., Freedom, Pa., has been promoted to the position of superintendent in charge of the Freedom refinery, to succeed **L. J. Major**, appointed manager, Pipe Line Division.

—o—

At the annual election of the Purchasing Agents' Association of Chicago, the following officers were elected: **William A. Macnider**, president; **Wallace B. Burnet**, first vice president; **Arthur F. Dallia**, second vice president; **H. H. Wise**, treasurer; **L. R. Seen**, secretary; **C. L. Otremba**, national director. The following members of the board of governors were also elected: **Robert Sedgwick, Eugene S. Page** and **William D. Jackson.**

—o—

Loring Phillips has been appointed market research analyst, Blaw-Knox Co., Pittsburgh. He had been a senior associate of Stewart, Dougall & Associates of New York, and from 1937 to 1942 served as regional field director of the National Industrial Conference Board.

—o—

At the recent annual convention of the National Welding Supply Association, the following officers, members of the executive committee and board of trustees were elected: President, **Ralph E. Chase**, Chase Welding Supply Co., Benton, Ill.; vice president, **Howard Proctor**, Acme Welding Supply Co., Houston, Tex.; vice president, **V. S. Rice**, Virginia Welding Co., Charleston, W. Va.; senior vice president, **R. S. Mars**, W. P. & R. S. Mars Co., Duluth; vice president, **W. T. Peters**, Welders Supply Co., Portland, Oreg.; vice president, **J. N. Alcock**, Saginaw Welding Supply Co., Saginaw, Mich.; and vice president, **J. W. Albiston**, Maine Oxy-Acetylene Supply Co., Auburn, Me.

Members elected to the executive Committee are Messrs. **G. G. Garman**, chairman, **R. C. Waldie, H. Savage, George Sommerfeld, J. W. Richards, C. A. Anderson, R. E. Chase.** Elected to the board of trustees are Messrs. **W. T. Peters, H. W. Proctor, W. J. Bentley, R. S. Mars, E. C. Caluwaert**, and **W. R. Boyd.**

—o—

K. U. Wirtz has been elected president of the Electric Furnace Co., Salem, O., to succeed the late **R. F. Benzinger.** He formerly was executive vice president of the company.

—o—

L. P. McAllister has been appointed assistant manager, steel plants, Lukens Steel Co., Coatesville, Pa.

—o—

W. J. Mair, superintendent of plant 2 at Poughkeepsie, N. Y., International Business Machines Corp., New York, has been promoted to works manager. He is succeeded as superintendent of plant 2 by **Joseph McManus. F. Paul Deuell** has been promoted to manager of the personnel department at the same plant.

—o—

Don Loeber has been appointed sales engineer in the New Jersey and metropolitan New York district for Cosa Corp., New York. He formerly was connected with the Eclipse Pioneer Division, Bendix Aviation Corp., Detroit.

—o—

Dr. Howard S. Turner has been appointed assistant director, Research & Development Division, Pittsburgh Consolidation Coal Co., Pittsburgh. He had been connected with E. I. du Pont de Nemours & Co., Wilmington, Del.

—o—

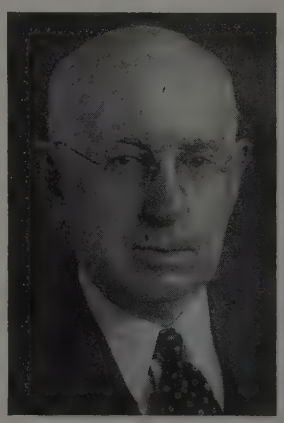
Lyman W. Slack, vice president and general sales manager, Packard Motor Car Co., Detroit, has been elected to the board of directors.

—o—

Kempton Dunn has been elected secretary of the American Brake Shoe Co., New York. He has been treasurer of the company since 1942, and later assumed the additional duties of assistant secretary of Brake Shoe and its Canadian subsidiaries. With his new appointment he becomes secretary-treasurer of the company. **Sumner T. McCall**, vice president and secretary of American Brake Shoe Co., will retire from active service June 1. Associated with the company since 1910, he has held the position of treasurer, secretary and vice president. **Cyrus E. Brush** has been elected an assistant secretary of the company to serve with **Samuel S. Drury Jr.**, also an assistant secretary.

—o—

The Southern California Chapter of the American Steel Warehouse Association has elected the following officers: President, **Wayne Rising**, Ducommun Metals & Supply Co., Los Angeles; vice president, **J. Thomas Mahl**, Mahl Steel



A. E. GRAPP

Continues duty as active chairman of the board of the Despatch Oven Co., Minneapolis. Noted in STEEL, May 19 issue, p. 81

BRIG. GEN. HUGH. C. MINTON

Named production manager of Koppers Co. Inc., Pittsburgh. Noted in Steel, May 19 issue, p. 81

C. L. CUMMINS

Elected chairman of the board of directors, Cummins Engine Co. Inc., Columbus, Ind. Noted in Steel, May 19 issue, p. 80

HERBERT C. GUTERMAN

Who has been elected president, Arma Corp., Brooklyn, N. Y. Noted in Steel, May 19 issue, p. 80

& Supply Co., Huntington Park, Calif.; vice president, **Frederick A. Purdy**, Joseph T. Ryerson & Son Inc., Los Angeles; secretary, **W. H. Lindberg**, Earle M. Jorgensen Co., Los Angeles; treasurer, **John L. Robertson**, A. M. Castle & Co., Los Angeles; national director, **E. Jungquist**, Percival Steel & Supply Co., Los Angeles.

—o—

J. M. Graham Jr., formerly assistant director, General Development Department, Monsanto Chemical Co., St. Louis, has joined the General Engineering Department as manager of the process section. **H. T. Gammon** has returned to his former post as manager of the project analysis section.

—o—

Gordon Monfort has been appointed advertising manager of Cutter Laboratories, Berkeley, Calif.

—o—

E. J. Bredeson, manager of the Chevrolet Motor Division plant at Muncie, Ind., General Motors Corp., Detroit, has been transferred to the manufacturing staff of the Chevrolet central office in Detroit. **J. L. Coyle**, general superintendent of the Muncie plant, will succeed Mr. Bredeson.

—o—

J. H. Jewell has been appointed manager, Apparatus Sales, Westinghouse Electric Corp., Pittsburgh. He has been manager of the company's industry sales department since 1944, and recently has been serving as acting manager of apparatus sales.

OBITUARIES . . .

August H. Tuechter, 78, president, Cincinnati Bickford Tool Co., Cincinnati, died May 17. He became president of the company in 1909 when the Cincinnati Machine Tool Co. took over the Bickford Drill & Tool Co., and reorganized as the Cincinnati Bickford Tool Co. He had served as general manager for both companies. Long a leader in Cincinnati's industrial activities, Mr. Tuechter has been an officer of several companies in that city, and was a past president and one of the organizers of the National Machine Tool Builders' Association. He also was active in numerous other trade and business associations.

—o—

Edward P. Galer, 65, former president of the Galer Equipment Co., New York, and a consultant on steel erection and hoisting problems, died recently in St. Petersburg, Fla.

—o—

Charles H. Scofield Sr., 72, formerly an electrical engineer, Singer Mfg. Co., New York, died May 16.

—o—

Edward L. Stine, 86, who retired three years ago from the Ferro Enamel Corp. after a long career in the porcelain enameling industry, starting in 1887, died May 19. He had been associated with Ferro since 1922.

—o—

Fred H. Fitch, 55, sales manager, Standard Spring Co., Chicago, died May 15 in that city.

—o—

J. Pierce Thompson, 59, founder and president, Eagle Iron Works, Des Moines, Iowa, died recently.

—o—

Don G. Gardner, 58, president of Gardner Publications Inc., Cincinnati, publisher of *Modern Machine Shop*, *Products Finishing*, and other publications, died suddenly, May 15, at his home in Hyde Park, a Cincinnati suburb.

AUGUST H. TUECHTER

—o—

Ralph H. Carey, 81, production engineer of the Anderson Knife & Bar Co., Anderson, Ind., since 1926, died recently.

—o—

Harland W. Spray, 64, assistant superintendent of the Manufacturing Division, Diamond Chain Co., Indianapolis, died recently.

—o—

Peter Hinkens, 72, president, Butler Street Foundry & Iron Co., Chicago, died recently.

—o—

M. T. Battis, 76, Battis Bros. Boiler Works, Oshkosh, Wis., died recently.

—o—

Wallace K. Brown, 63, retired vice president, Crocker - Wheeler Electric Mfg. Co., Ampere, N. J., died May 12.

—o—

Frank E. Gardiner, sales manager, Walker Metal Products Co., Windsor, Ont., died May 17.

—o—

Arthur E. Mace, 73, retired manager of the Cleveland lamp warehouse, General Electric Co., Schenectady, N. Y., died May 20.

WELDING POWER PIPING WITH Chromium-Molybdenum

DURING 1946, new low chromium-molybdenum steels were widely adopted for power piping fabrication. Chromium-molybdenum steels were, of course, used in the petroleum industry for some years, but analysis used, type 502, containing 5.0 per cent chromium and 0.50 per cent molybdenum, is richer in alloy than the steels discussed here. Type 502 analysis was selected by petroleum refiners for resistance to scaling and corrosion, which is an entirely different application from that in the power piping field.

Power piping installations utilized the advantage of molybdenum for improved creep strength at the higher service temperatures and pressures of more recent designs. They were considered to be very satisfactory until failures began to occur in 1943. Upon investigation, metallurgists discovered an unsatisfactory formation of graphite in the heat-affected zone of the pipe.

This graphitization could be prevented, studied showed, by alloy additions, by careful melting practices and by certain methods of deoxidation. Discussions of ways and means of preventing the formation of a graphitic structure of impaired ductility still continue. There has, however, been rather general agreement among metallurgists on the effectiveness of chromium additions to carbon molybdenum steels to inhibit undesirable graphitization. This article, however, is confined to the welding electrodes used in low chromium-molybdenum steel fabrication during the past year.

Whereas a minimum effective composition of 0.35 per cent chromium and 0.50 per cent molybdenum seemed to be acceptable for less severe operating conditions, fabricators adopted 0.50 per cent chromium and 0.50 per cent molybdenum steels in many cases as the leanest alloyed material, and have gone from there to 3.00 per cent chromium with 1.00 per cent molybdenum. Among the available analyses of electrodes are those listed in Table I.

While the variety shown in Table I might be considered comprehensive, one recent installation called for electrodes to deposit weld metal of 0.75 per cent chromium and 0.50 per cent molybdenum. This analysis was manufactured in a special run.

Four types of coatings are available for metallic arc welding electrodes used with low chromium molybdenum steels. Three of these coatings are for manual application while the fourth can be used either for manual or for automatic welding. The American Welding Society designations for these coatings are XX10, XX13, XX15, and XX20.

Coating designated as XX10 is an organic or cellulosic type that was used for piping fabrication for many years. With a rather high arc voltage, a penetrating arc of very good stability, the XX10 type gives sound welds with a nicely balanced set of tensile and ductility properties. As deposited in pipe joints, the weld surface is uniform, the bead is flat, spatter is reasonable, while the slag is readily controlled and removes easily. Undercut is not troublesome and surface porosity is either very slight or completely absent. The XX10 electrodes are all position products although the small diameters such as 1/8 and 5/32-in. should be selected for root passes and either 5/32 or 3/16-in. may be employed for subsequent passes. These electrodes are useful with direct current, reverse polarity only.

Since many fabricators wish to use alternating current, another series of chromium-molybdenum electrodes uses

TABLE I

Analyses of Chromium-Molybdenum Electrodes for Power Piping

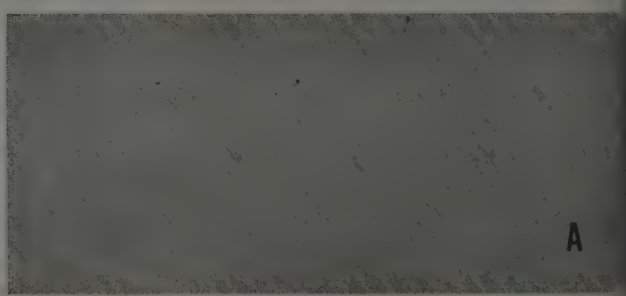
Nominal % Chromium	Composition % Molybdenum	Chromium Range %	Molybdenum Range %
0.5	0.5	0.40-0.60	0.45-0.65
1.0	0.5	0.90-1.10	0.45-0.65
2.0	0.5	2.00-2.50	0.45-0.65
2.0	1.0	2.00-2.50	0.90-1.10
3.0	1.0	3.00-3.50	0.90-1.10

TABLE II

Tensile and Elongation Values for 3/16" XX10 and 3/16" XX13 Weld Deposits Made According to AWS-ASTM A233-45T and Stress-Relieved for 1 Hour at 1150° F.

Type	% Cr	% Mo	Yield Point psi	Ult. Strength psi	Elongation % in 2"	Reduction of Area, %
1110	0.5	0.5	65,250	77,750	19.9	56.7
1113	0.5	0.5	80,000	93,750	20.7	53.3
2110	1.0	0.5	76,250	91,250	18.8	49.7
2113	1.0	0.5	90,750	105,250	18.4	49.8
4110	2.0	0.5	82,750	98,750	17.6	49.6
4113	2.0	0.5	103,000	121,750	12.5	33.7
4210	2.0	1.0	92,500	113,250	16.4	51.6
4213	2.0	1.0	93,000	130,750	15.0	46.6

Fig. 1—Some slight scattered porosity may be revealed during x-ray examination of pipe welds made with XX10 chromium-molybdenum electrodes as shown in A. Exograph B discloses perfectly sound weld of an XX13 chromium-molybdenum deposit



Electrodes

By ORVILLE T. BARNETT
Division Engineer
Electrode Division
Metal & Thermit Corp.
New York

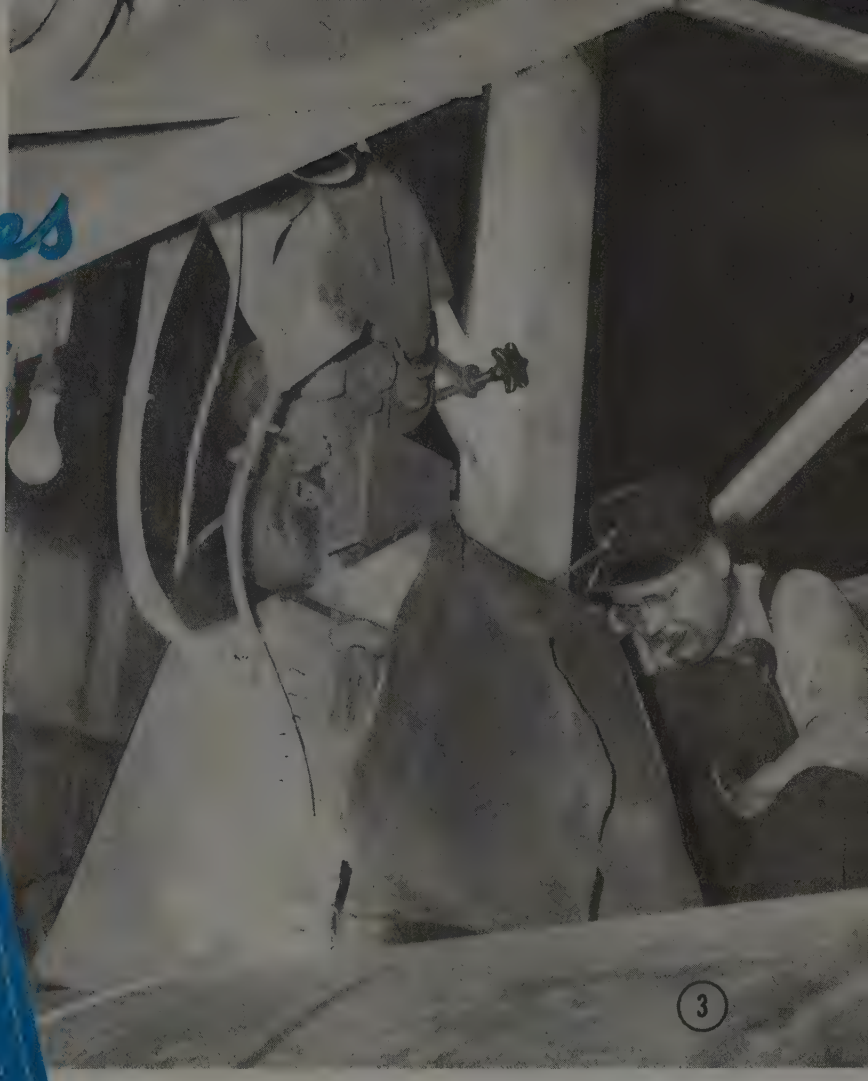


Fig. 3—As shown here XX20 electrodes furnished in continuous coils are used for automatic welding chromium-molybdenum pressure vessels

Fig. 2—Effect of increasing chromium with molybdenum fixed at 0.5 per cent. Welded with 500° F preheat and interpass, 1300° F for 2 hours postheat temperatures

TABLE III

Tensile and Elongation Values for 3/16" XX10 and 3/16" XX13 Weld Deposits Made with a 500° F. Preheat and Interpass Temperature and Postheat Treated at 1300° F for 2 Hours

Type	% Cr	% Mo	Yield Point psi	Ult. Strength psi	Elongation % in 2"	Reduction of Area, %
1110	0.5	0.5	47,250	63,500	33.2	70.2
1113	0.5	0.5	73,000	82,750	25.8	60.1
2110	1.0	0.5	56,750	67,250	29.3	67.1
2113	1.0	0.5	75,500	90,125	23.8	61.0
4110	2.0	0.5	59,750	79,000	23.4	64.9
4113	2.0	0.5	78,250	95,500	19.5	53.7
4210	2.0	1.0	66,250	84,500	23.8	62.5
4213	2.0	1.0	84,250	99,750	18.4	51.7

TABLE IV

3/16" 2110 Mechanical Properties Using AWS-ASTM Welding and Stress-Relieving Procedures as Compared with 500° F Preheat and Interpass Temperatures and 1300° F. Stress-Relief for 2 Hours

	AWS-ASTM Procedure	Typical Commercial Procedure
Preheat and Interpass Temperatures, °F.	212	500
Stress Relieving Temperature, °F.	1,150	1,300
Holding Time at Temperature, Hours	1	2
Yield Point, psi	76,250	56,750
Ultimate Strength, psi	91,250	67,250
Elongation, % in 2"	18.8	29.3
Reduction of Area, %	49.7	67.1

an XX13 coating which is suitable for alternating or direct current, reverse polarity. In addition, the XX13 base may give a somewhat more sound deposit than the XX10 which may be seen in the two exographs, Fig. 1. However, the difficulties in reproducing such x-ray negatives are considerable.

A, in Fig. 2, an 1110 deposit (XX10 coating of 0.5 per cent chromium, 0.5 per cent molybdenum) shows slight scattered porosity, while B, an 1113 deposit (XX13 coating of 0.5 per cent chromium, 0.5 per cent molybdenum) discloses no porosity whatever. The XX13 coating lends itself to all position applications just like the XX10. There is more slag, of course, because this is the heavily coated XX13 type but acceptable techniques are being used regularly. The extremely good arc stability appeals to welders and the consistently high level of x-ray cleanliness is attractive to welding engineers and inspectors.

Because the low chromium molybdenum steels are hardenable, a demand materialized for these analyses with an XX15 low hydrogen, lime ferritic coating. Both the XX10 and XX13 series were developed for all position welding only with a 3/16-in. maximum diameter while the XX15 series was made in all diameters to ¼-in. for all position, horizontal fillet and flat position welding. For casting repairs, ¼-in. XX13 electrodes have been produced but this is not a regular item. Some of the XX15 electrodes also are being used for casting repairs without preheat, as well as for piping and valve assemblies either with or without preheating. Heat treatment after welding is a practice that is almost universally followed.

Hot rods of the XX20 class for downhand welding of heavy piping, valves and pressure vessels provide the usual fast, high quality welds common to this coating design. Electrodes may be used (*Please turn to Page* 125)

TABLE V

Physical Properties of Weld Deposit from Type 2115 Electrodes Used in Chromium-Molybdenum Casting Repair. (Normalized for 2 Hours at 1650° F—Air Cooled; Stress Relieved for 2 hours at 1150° F.)

Yield Strength, psi	52,250
Ultimate Strength, psi	76,500
Elongation, % in 2"	32.2
Reduction of Area, %	64.0

TABLE VI

Tensile and Elongation Values for 3/16" Type 4210, 4213 and 4215 Weld Deposits Made According to AWS-ASTM A233-45T and Stress-Relieved for 1 Hour at 1150° F.

Type	Yield Point psi	Ultimate Strength psi	Elongation % in 2"	Reduction of Area, %
4210	92,500	113,250	16.4	51.6
4213	93,000	130,750	15.0	46.6
4215	79,750	142,875	16.0	50.3

TABLE VII

Physical Properties of Weld Deposit from Type 6215 Electrodes Used in Power Piping Fabrication

Yield Strength, psi	64,750
Ultimate Strength, psi	82,250
Elongation, % in 2"	24.8
Reduction of Area, %	65.6

TABLE VIII

Test Results of Type 6215 Welds for ASME Pipe Procedure Qualification Tests

	Vertical Fixed Position	Horizontal Fixed Position
Reduced Section Tensile Test, psi (Average of Two Specimens)	74,950	75,200
Free Bend, % Elongation (Average of Two Specimens)	44.2	49.0
Side Bends (Four Specimens)	OK	OK

TABLE IX

¼" Type 1120 Mechanical Properties Using AWS-ASTM Welding and Stress-Relieving Procedures

Yield Strength, psi	70,125
Ultimate Strength, psi	77,000
Elongation, % in 2"	24.6
Reduction of Area, %	52.1

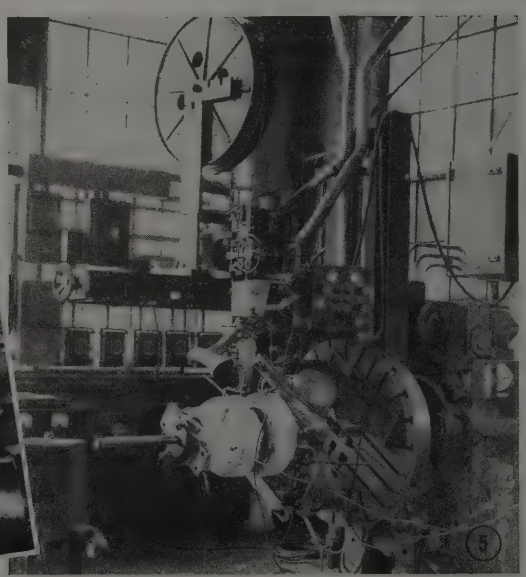


Fig. 4—Typical large valve fabricated with XX20 chrome-moly electrodes by automatic welding

Fig. 5—Induction preheating valve parts prior to welding. Figs. 4 and 5, courtesy Chapman Valve Mfg. Co.

Refined Techniques for

Magnetic Particle Inspection of Welds

Presented at Conference

SOME 200 engineers and technicians engaged in welded fabrication spent May 8 and 9 in Chicago attending a conference on weld inspection by the magnetic particle method. The conference, held at the Congress hotel, was sponsored by the Magnaflux Corp., Chicago. Those who were present and participated in the discussion on mornings and afternoons of the two days represented a wide range of industries, many of them in the metal-working group, governmental agencies and the armed services, located in an area extending from Nebraska to the Eastern Seaboard and from Canada to the Gulf of Mexico.

Inspection by magnetic particle is not a new procedure, having had over 15 years of development and use, and having undergone tremendous expansion during the war. Aim of the conference, therefore, was not to explore the application of a new method of inspection, but rather to discuss modified and refined techniques and to obtain a better understanding and interpretation of test results.

The conference was opened by C. E. Betz, vice president, Magnaflux Corp., who reviewed fundamentals of the magnetic particle method. He was followed by W. E. Thomas, vice president and manager of field engineering of the company, who went into considerable detail in describing techniques employed.

For those not familiar with the magnetic method, it is applicable only to the detection of flaws in material which can be magnetized. It depends for its operation on the fact that if a crack or crack-like discontinuity in a piece of magnetized material is so located as to be transverse to the direction of the magnetic field in the material, that field is distorted and the flux lines are crowded or deflected around the ends of such a magnetic obstruction.

If the obstruction lies near enough to the surface of the material, some of these flux lines will be crowded outside the material itself, and a leakage field is produced at the surface at a point over the discontinuity. The nearer the discontinuity is to the surface, the stronger is this leakage field, and if the discontinuity actually breaks the surface as, for instance, a surface crack, the leakage field is quite strong and highly localized.

If a powder—either dry or suspended in a liquid—consisting of fine particles of magnetic material, be applied over such a surface in the vicinity of such a leakage field, some of the powder will be attracted and held by the leakage field and thus set up a magnetically-held pattern outlining the discontinuity.

Two points are fundamental: (1) Given a part containing discontinuities, it is necssary to produce good leakage fields by so magnetizing the part that the resulting field will intercept the discontinuities, and (2) strength of the leakage field, and hence the strength of the powder patterns produced will vary with intensity of the magnetization set up in the part.

Methods of Magnetization

One method of magnetization is to use coils in which the parts are placed, or coils wound with flexible cables to suit the size and shape of the part. However, direction of such fields is not easily controlled in odd-shaped parts. A much more effective method is to pass current directly through the entire part or structure, or locally, as in weld fillets, by means of prod contacts applied to the surface, in a direction to set up fields favorable for creation of maximum leakage fields at defects.

Sensitivity may be affected by choice of magnetizing current—whether alternating or direct. Alternating current, because of skin effect, magnetizes the surface layers of material more strongly than those deeper in the part. Direct current, on the other hand, penetrates more deeply into the cross-section.

Four types of direct current may be used as follows: (1) Nonfluctuating direct current; (2) direct current with an initial surge of high current, quickly dropping down to a lower steady value; (3) full-wave rectified alternating current which is a slightly pulsating direct current, and (4) half-wave rectified alternating which is a form of intermittent direct current with no current flowing between the pulses of current which occur at the alternating current line frequency.

In his remarks, Mr. Thomas said that one trouble with magnetic particle inspection is that no tolerances are specified, and too much work is rejected. Management sees these losses and since the war forms an opinion which is detrimental to inspection by the process. As a result, the method must now prove its economic value. Some standards must be set up as to what discontinuities or defects are cause for rejection and those that are not.

John J. Chyle, director of welding research, and A. Cota, engineer in charge of nondestructive testing, A. O. Smith Corp., Milwaukee, contributed a paper on "Magnaflux in Relation to Other Weld Inspection Tests," and after its presentation the two authors, Mr. Betz and Mr. Thomas constituted a panel to direct open forum discussion.

One question which arose was whether stress relieving of a weld affects the powder pattern. Agreement was general that it does. One speaker pointed that welding changes the structure of metal and thereby its permeability. Another speaker who has had experience in this matter stated that stress relieving results in an increase in defects, at least enables more to be picked up, particularly subsurface. It was also brought out that the harder the steel, the more difficulty in locating defects at great depth. With annealing, therefore, more defects are revealed by magnaflux.

Highlighting the program for the second day were open forum discussions on magnetic powder inspection procedure in connection with welding in specific fields. Topics and discussion leaders were as follows: "Machinery Weldments"—J. W. Owens, director of welding, Fairbanks, Morse & Co., Beloit, Wis.; "Pressure Vessel Manufacture"—Perry C. Arnold, chief inspector, Chicago Bridge & Iron Co., Chicago; "Field Inspection of Vessels and Tanks"—Russell J. Love, executive secretary, pressure vessel re-

(*Please turn to Page* 130)

Drawing and Forming with Zinc Alloy Dies

Simply and easily-worked special zinc die material, according to the author, is admirably suited to the production of relatively small runs of pressed steel parts, supplementing conventional metals. Full story of this "short-run" die alloy will be presented by STEEL in a series of four articles beginning with this installment

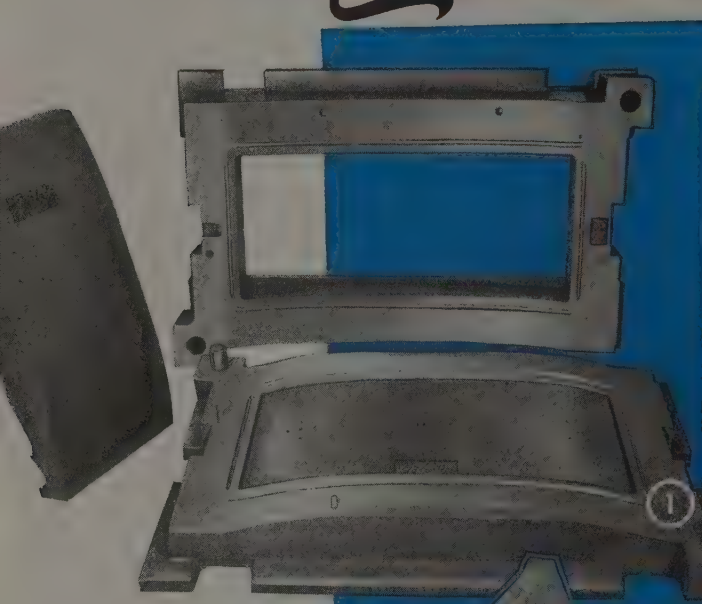


Fig. 1—Refrigerator cabinet lower front panel, left, and the dies used for forming it

Fig. 2—Second cross member in 160-in. Chevrolet truck frame (of 5/32-in. SAE 1010 cold rolled steel) produced in quantity on zinc alloy die set shown

Fig. 3—Truck cab lower back panel, right, and the large die elements required to shape it

TABLE I

SUMMARY OF COMPARATIVE COSTS

(On basis of 1940 Wage rates*)

Component	Weight lb	Cast Iron Net Cost	Salvage Value	Weight lb	Net Cost	Kirksite Salvage Value	Net Cost
Cab back panel	16,000	$7,025.00	$100.00	17,600	$3,595.00	$1,980.00	$3,430.00
Cab top panel	12,000	6,400.00	75.00	13,200	3,265.00	1,485.00	3,135.00
Cab inner lining panel	9,500	2,505.60	59.40	10,400	1,330.00	1,170.00	1,175.60
Cabinet top panel	6,200	911.25	38.75	6,800	615.00	765.00	296.25
Cabinet door panel	8,600	1,496.25	53.75	9,400	980.50	1,057.50	515.75
Cabinet lower front panel	1,900	763.15	11.85	2,050	482.50	230.65	280.65
Total	$54,200	$19,101.25	$338.75	59,450	$10,268.00	$6,688.15	$8,833.25

* Estimates indicate 1947 rates are 50-100 per cent higher.

LONG-STANDING prejudice against "short-run" nonferrous die materials in the production of steel stampings is now tempered by the success achieved by the aircraft industry during the war years in shaping aluminum alloy elements on zinc alloy dies in presses and drop hammers.

Appreciable cost savings accruing from the excellent casting properties of Kirksite-type alloy, together with ease of polishing, machining and welding, good abrasion resistance, self-lubricating properties, reasonably good physical characteristics, and the readiness with which it may be remelted and reused, stimulated research and development on the material for dies to form steel stampings in quantities far beyond previously accepted limits. Pioneering in this work, engineers of the General Motors Overseas Operations, in co-operation with the Fisher Body Division, assembled comprehensive data on the entire procedure.

Deep drawing and forming of large sheet steel pieces is a comparatively recent development, paralleling the growth of the automobile industry. In fact, its developments can be traced to a certain degree in the gradually changing lines of the automobile, from the many small sectioned, squared and simple curved parts used in early manufacture, to the modern streamlined version involving many compound curves and indentations, but requiring comparatively few large sections to make up the whole.

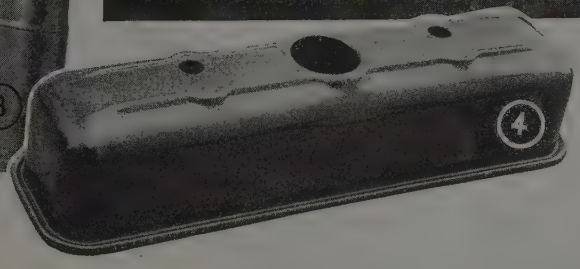
In the early days of the automotive industry, all panels were cut, folded, bent and shaped on simple equipment, then available, or beaten by hand over hard wood patterns. Drawing operations were confined chiefly to small parts. The latter were shaped by a series of graduated, shallow punch press operations.

As demand increased, the larger volume body builders gradually adopted cast iron and steel dies in mechanical or hydraulic presses, this technique having been developed in the production of fenders, shields, pans and other standard sheet metal parts. However, due to the cost of equipment and dies, lesser volume producers were compelled to continue with hand methods. This condition was alleviated for a time by the introduction of the Artz stretcher press, on which fairly accurate formed panels were obtained. (*Please turn to Page* 100)

By S. MENTON
Manufacturing Manager
General Motors Overseas Operations
Detroit

Fig. 4—Typical example of steel stamping produced on Kirksite die is this engine rocker arm cover for the English Vauxhall car. More than 15,000 stampings of 20 gage hot rolled pickled steel were drawn on a single die set

Fig. 5—Cold quenching large zinc alloy die with water spray to increase hardness by about 30 per cent



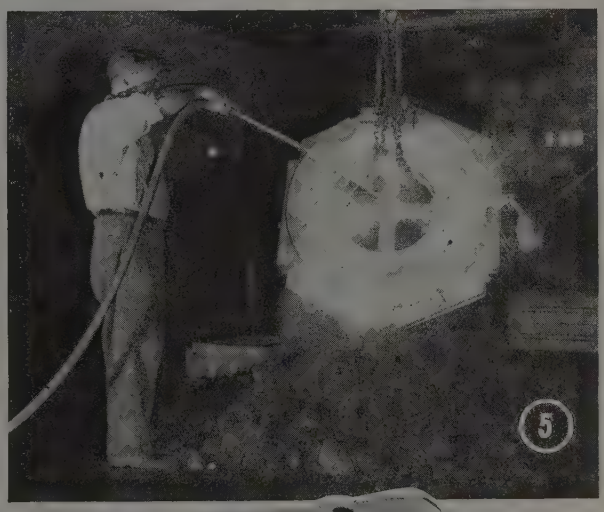


TABLE II
COMPARISON OF PHYSICAL CHARACTERISTICS

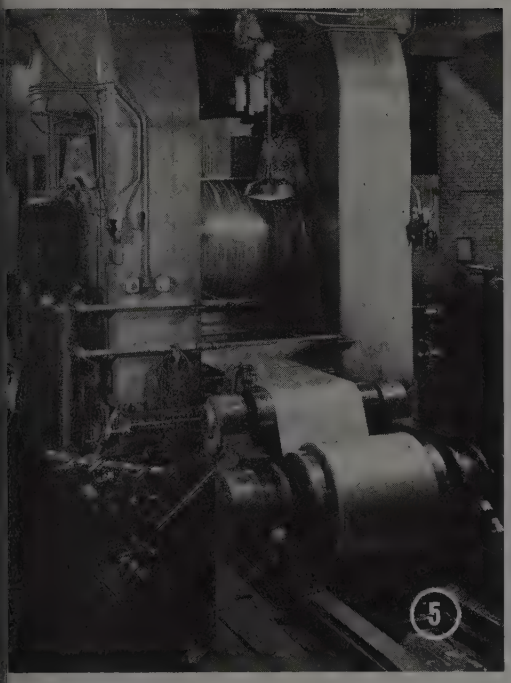
Characteristics	Cast Aluminum Alloy	Copper	Cast Iron	Magnesium	6% Antimonial lead	Zinc	Cast Kirksite
Ultimate tensile strength psi	19,000	20,000	18,000				
	29,000	30,000	50.000		6,840	5,300	37,800
Charpy impact ft-lb to break ½-in. bar	0.6 to 4.0		Less than 1				4.0
Brinnell Hardness	40–70		132–170		11.8	30–60	100
Solidification shrinkage—in per ft	0.156						(130 quenched
			0.125			0.125	.14
Compressive strength psi			.188				
							60,000–75,000
Melting point—°F	1200	1950					
			2500–2800	1200	600	785	717
Weight per cu in lb	0.0963	0.3195					
Weight per cu ft lb	166.5	552	0.2604	0.0641	0.4106	0.2567	0.25
Elongation in 2 in.			453	109	709.7	443.5	432
					24		3

By E. L. H. BASTIAN
Staff Engineer
Shell Oil Co. Inc.
New York

Fig. 3—Gear grinding operation. Note the flood of coolant engulfing the work area as this large 26-in. spur gear is processed on a universal hydraulic vertical grinder. Photo courtesy Pratt & Whitney

Fig. 4—On this Sundstrand automatic lathe, a fan-shaped nozzle is used to flood the coolant onto the work running at high speed

Fig. 5—Cold reduction of continuous steel strip can be accomplished with either single system of coolant distribution. With the single system illustrated, emulsion of soluble oil, palm oil and water is applied to rolls and strip by spray nozzles, this emulsion being caught and recirculated for continuous use. Courtesy Republic Steel Corp.



Composition, Control and Selection of . . .

Coolants

for Working Metals

Last week the author outlined factors relative to composition of typical water soluble or emulsifiable materials. This week, he concludes his discussion with selection of coolants for various operations including rolling, drawing and grinding

IN SELECTING coolants for specific metalworking operations, it probably will be desirable first to consider the old question of emulsion coolants versus oil type fluids. Both have a proper place in metalworking applications. In some cases, there may be a choice of either with comparable results, depending upon their respective compositions. In such cases, the matter of economy will probably influence the decision. Shell engineers believe the principal factors to consider in choosing emulsions or coolants versus mineral type fluids are as follows:

1. Cooling requirement of work and machine
2. Lubrication requirement at point of application
3. Necessary stability and service life
4. Operation requirements regarding:
   - (a) Finish on work piece
   - (b) Production rate
   - (c) Tool or die life
5. Effects of coolant or fluid on working parts or mechanism of machines
6. Physiological effects on operators
7. Operator preference
8. Economy regarding:
   - (a) Initial costs
   - (b) Operating costs
   - (c) Maintenance
   - (d) Recovery and re-use.

A review of these factors will, in any given case, clarify the logical choice of coolant or metalworking fluid best suited for the job. Each of these factors with the possible exception of economical considerations will be a function of the particular application and must be weighted accordingly. As mentioned in the first part of this article (STEEL, May 19, p. 82), the principal groups of metalworking applications in which coolants, principally emulsions, play an important part are as follows:

1. Metal cutting and sawing
2. Metal grinding
3. Metal rolling
4. Metal drawing, stamping, and forming

Application of coolants in these fields will be considered in this order.

Metal cutting generally implies certain basic requirements of the cutting fluid or coolant. It must possess:

1. Cutting ability with respect to:
   - (a) Rate of metal removal
   - (b) Surface finish on work
   - (c) Tool life

These characteristics are imparted to the fluid by virtue of its:

1. Cooling characteristics
2. Lubricating characteristics
3. Chemical activity characteristics.

Emulsion type coolants or fluids, of course, possess superior cooling properties due to the water present which carries off heat rapidly. They may possess considerable lubricating value if compounded with sufficient proportion of such materials as fatty oil, acids, and mineral oils. In general, however, they do not have the lubricating value of mineral type fluids.

Chemical activity can be imparted to emulsions by addition of chemically active agents incorporating sulphur, chlorine, phosphorus, and other compounds. However, care must be taken in such formulations to avoid secondary products as a result of combinations with the water contained in the emulsion. The presence of active chlorine in water, for example, may produce hydrochloric acid resulting in machine and work corrosion, and can be harmful to operators' health.

There are other operating requirements imposed on coolants used for metal cutting. They must generally do the following satisfactorily: (*Please turn to Page* 107)

In this final section of the series the author discusses best procedures to follow in filing die castings, saws, extra-soft materials, and in precision work involving innumerable shapes, sizes and cuts

Manufacture, Selectio

DIE CASTINGS as they come from the dies have sharp corners, fins, and webs or flashings. These are damaging to the teeth of ordinary files, hence special purpose files are needed. In selecting files for die castings, characteristics of the various materials involved must be taken into consideration. These materials, commonly zinc, aluminum, magnesium and their alloys, have tendency to clog regular files. Die casting files therefore have extra-strong teeth—on corners and edges as well as on the sides—these being designed to overcome clogging and to give good finish on large casting surfaces, Fig. 14. Large castings are held in a vise and filed with both hands. Smaller ones frequently are held in one hand and filed with the other.

Another special purpose file is used for alloy steels, including stainless. Exceptional wearing qualities are incorporated to overcome the abrasive action of nickel and chromium alloys steels which tends to shorten life of ordinary files. Shapes and sizes are the same as in general purpose files. These tools are best employed with light pressures, slow, steady strokes giving rapid stock removal with good finish, Fig. 15.

Aluminum is a difficult material for ordinary files to handle. Soft, ductile and malleable, it causes teeth to become clogged even under moderate pressure. Filing of this metal falls into three classifications: (1) Removal of roughness from castings; (2) trimming and smoothing sheets and bars; and (3) various operations on aluminum alloys, Fig. 13.

A special rasp is good for fast rough metal removal, but for fast cutting combined with good finish, there is a special tooth design which effectively prevents clogging. Upcut is deep with an open-throat and overcut is fine. This produces small scallops on the upcut which break up the chips, permit the file to clear, overcome chatter and prevent too large a "bite" into the work. With this tool, a shearing stroke toward the left gives good finish.

Brass Difficult To File: Brass is a difficult metal to file. It is softer than steel, but tough and ductile. Sturdy, extremely sharp teeth cut at an angle to prevent grooving, and shaped to prevent clogging, are "musts" for brass. The brass file also has a fine, long-angle overcut in addition to a short upcut angle, resulting in small scallops which break up and clear the chips. With very moderate pressure, the sharp high-cut teeth bite deep. With light pressure their short upcut angle produces a smoothing effect, Fig. 12.

Metal removal in normal filing of lead, babbitt, pure copper and other extra-soft materials is practically a shaving operation. Files for this work have coarse, short angle single-cut teeth. These virtually are a series of blades which shear away metal rapidly under ordinary pressure, while with lighter pressure they give a smoldering result. Lead "float files" are used largely by machinists on soft bearings, shims and molded parts. They are used by plumbers and plumbing manufacturers on lead pipe fittings and soldered joints.

There are other special shear-tooth files combining fast stock removal with good finishing qualities for smooth final operations on soft metals and alloys, Fig. 11. Coarse single cuts and long angles contribute toward chip clearance, thus minimizing clogging. It should be mentioned that on narrow surfaces, under certain conditions, shear-tooth files have a tendency to run to the left because of the steep angle of their teeth. To overcome this a slight diagonal stroke to the right should be used.

Saw Filing: Saw filing is a real art. Both in range and technique this art of saw sharpening embraces a broad

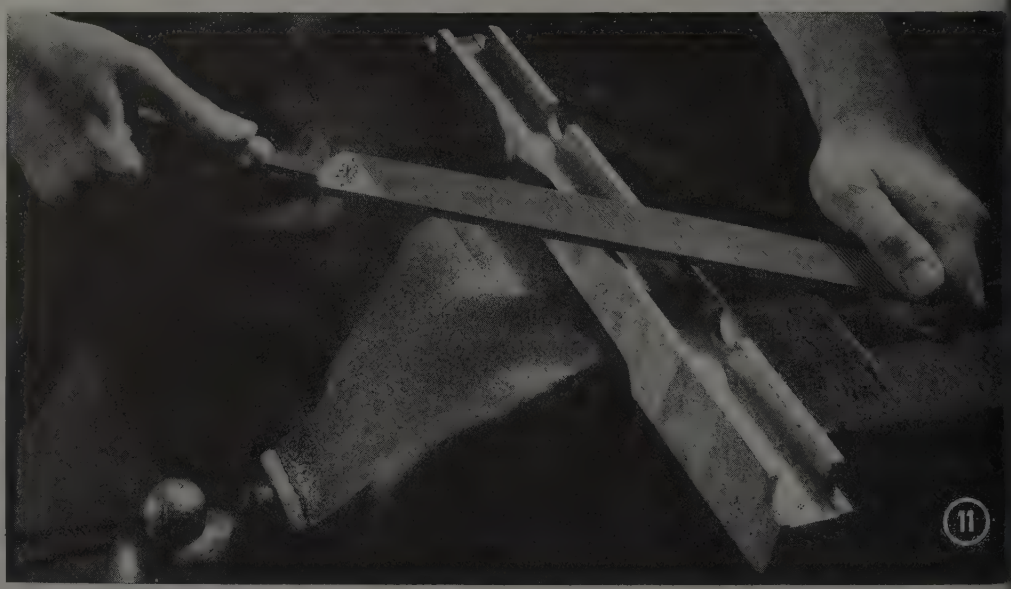


Fig. 11 — Special shear tooth file for smooth finishing soft metals and alloys

Fig. 12 — Sturdy, very sharp teeth are needed for filing brass. See inset

Fig. 13—In filing aluminum, a file is required which avoids clogging of teeth. See inset

ınd Use of Files

By L. E. BROWNE
Associate Editor, STEEL

field. Saws are of numerous types, and so necessarily the number of files required is substantial. Correct file design, cut and size for each type of saw and each kind of saw tooth to be filed is the basic consideration. Having selected the right file, filing strokes must be kept level. The slightest rocking motion affects point sharpness and cutting edge of saw teeth. The file must be lifted clear of the work as it is drawn back after each cutting stroke.

Saws must be "set" in most cases before filing is started. Setting is the process of lining up points of teeth at proper angles in relation to each other. Saw blades must also be held correctly, preferably in a saw vise. It should be mentioned here that woodcutting handsaws are of two types, rip and cross-cut. Each has distinct tooth-shape and setting requirements.

Preliminary to filing the saw should be "jointed." That is, tops of teeth should be brought to equal height. This "jointing" usually is done by traversing a file lengthwise along tops of teeth. Some teeth will be flattened, others barely touched. Obviously the former will require the most filing. A thoroughly satisfactory way of setting saws is by means of a sawset, a tool made expressly for that purpose. In setting, saw teeth are bent slightly, but uniformly alternately to right and left, thus making width of the saw cut or "kerf" wider than the blade itself. This prevents binding in the cut.

To a distance of about half the thickness of the tooth—both on crosscut and rip saws—alternate teeth are set in opposite directions, this setting being done only to the top half of each tooth to avoid breaking them or cracking the saw blade. Crosscut handsaw teeth cut with edges and points, hence their edges should be beveled accurately and filed sharp. Starting at the point of the saw, the filer works toward the handle, the saw being clamped in its holder with handle to right.

For filing hand crosscut saws, the following files are used: Slim taper, 6 or 7-in. for saws with five to seven points to the inch; extra slim taper, 7-in. saws with eight or nine points to the inch; extra slim taper, 4 to 5½-in. saws with 10 or 11 points to the inch.

File is placed in gullet of first tooth which is "set away" from filer, and is held level with angle of the saw blade, touching evenly on bevels of two teeth so that both sides of gullet are filed at one stroke. And here is something important—the file must be kept level throughout its stroke.

If some teeth have flat tops, the result of earlier jointing when the file was passed lengthwise over them, these teeth are filed only until half the flat top is cut away. The next gullet is skipped, this skipping procedure being followed until every other gullet has been filed. Saw is then reversed. Now, starting again at point of the saw, the

(*Please turn to Page* 132)

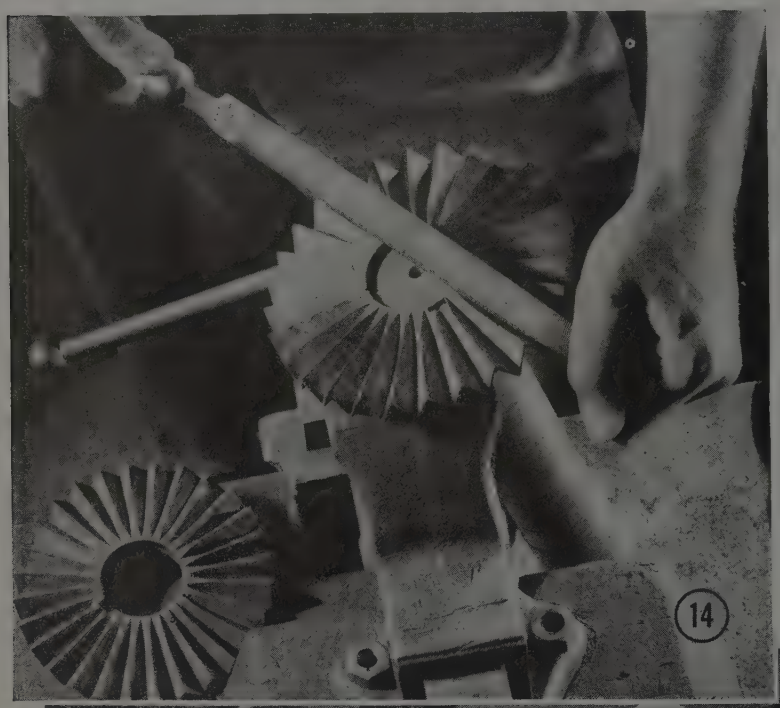


Fig. 14—*Die castings are filed with half-round special purpose file*

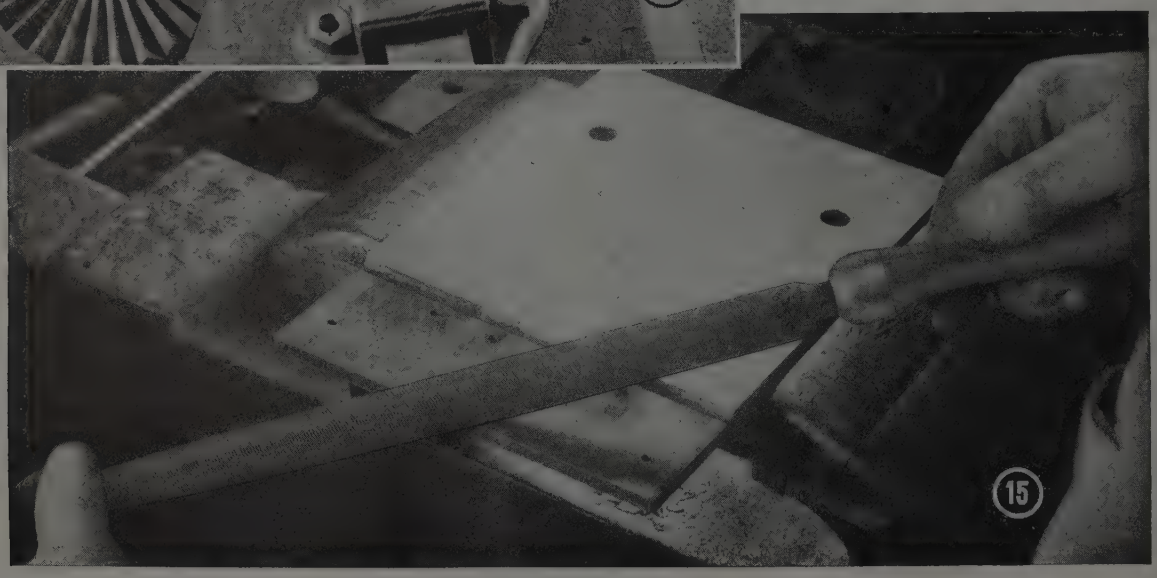


Fig. 15—*Filing stainless steel requires tool of exceptional wearing qualities*

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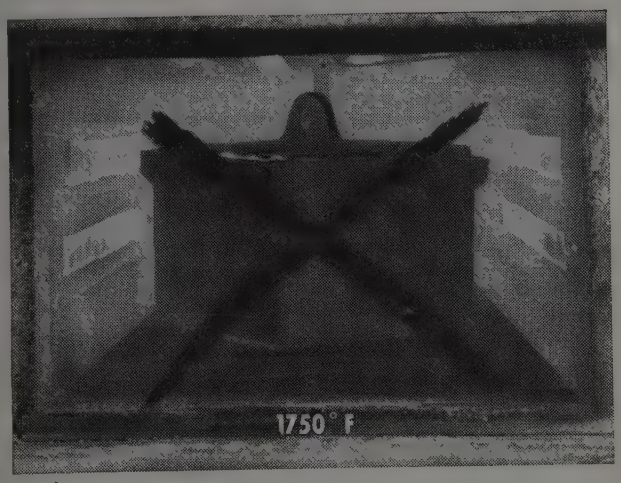

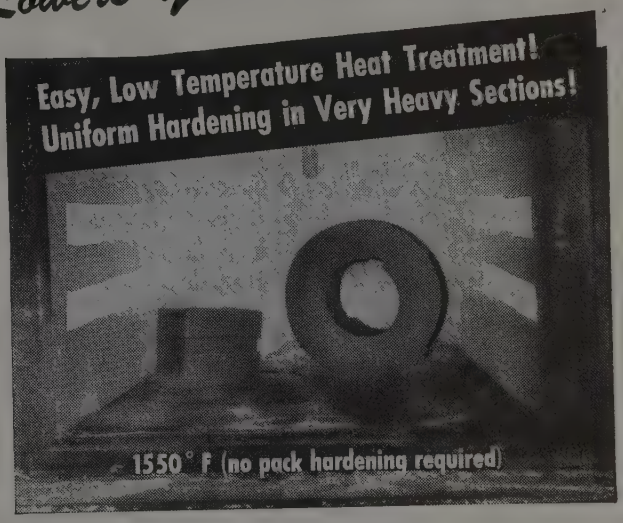

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Zinc Alloy Dies

(*Continued from Page* 93)

Gradual and continuing improvement in die design, press equipment and sheet steel characteristics took place at the same time public demand was changing over from open to closed models. Likewise, body contours became more complex as time went on. This resulted in the eventual adoption of press operations and the use of cast iron and steel dies on all body panels by large volume producers. At the same time, lower volume producers were forced to adopt this technique as usefulness of stretch press was confined to simple curved forms.

Extensive use of cast iron and steel dies also led to the development of the Keller-type semiautomatic profiling machine, for reproducing dies from full-size "mock-ups" or panel models. With this equipment a single die may be designed, for instance, to form the complete side of a motor vehicle out of a single sheet of steel in one pressing operation. While the first cost of such equipment is high, it is offset by the reduction in labor costs, savings in time and accuracy of the dies produced.

Obviously the investment in profiling machines and presses, coupled with die costs, makes press operation economical, and the ultimate cost per piece reasonable, only when spread over a large volume of parts. As a result, the need for a new technique for low and medium volume producers was readily apparent to industry as a whole. Only sporadic efforts were made in this direction, unfortunately, which were neither co-ordinated nor concentrated.

In the late twenties, for instance, one stamping supplier of the automobile industry made a number of panels using a lead punch and zinc die in a drop hammer. While "soft" materials, such as lead and zinc dies, are easily worked into die forms, their life is limited to the production of comparatively few pieces. Under extensive use, dies of these materials are quickly battered out of shape by the hammer blows, some of the metal sloughs off in the process; and the panels require extensive fitting and and finishing. This experiment with zinc and lead die forms, therefore, was abandoned shortly as cost of fitting and finishing the panel produced offset the reduction in investment.

Effects of High Cost Die Materials

As a result, low-volume producers have been forced to continue using high cost die materials. This fact had two immediate effects. Those manufacturers enjoying the largest volume still are limited in the number of distinct body styles which they can offer the public, while those with less volume are burdened with higher costs per unit.

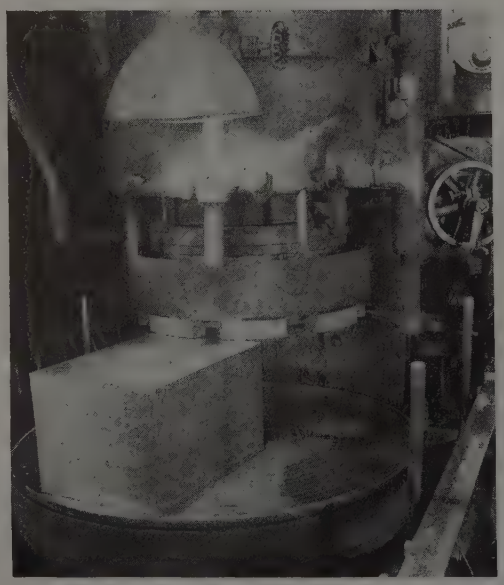
Lower volume producers had two courses to follow—first, to design a basically simple model, utilizing universal type of equipment and a minimum of tooling in order to compete in price with other lines; or second, to ignore competition by incorporating special design features and equipment to justify the extra cost.

When the aircraft industry initiated production of all-metal planes, small air-frame stampings were made with antimonial lead punches and zinc dies mounted in drop hammers, while the larger skin panels were hand-beaten over hard wood or metal punch forms. To increase the output of hand-hammered panels, stretcher presses were used to some extent. But again, equipment was costly and the applications limited. As expansion in the industry and increases in volume occurred, production problems became more pressing but "hard dies" were out of the question as production still was measured in units rather than thousands. Various expedients were resorted to, but the use of large lead punches and pure zinc dies in rope-type drop hammers found general acceptance. Many of these hammers were hand-built improvisations developed for the particular purpose.

The aircraft industry uses aluminum alloys for panels and, of course, the number of panels which can be produced from a given set of "soft dies" is greater than if steel sheets were used. However, with increasing production, the aircraft industry experienced the same difficulties with these dies as did the automotive industry. With continuing expansion, this problem grew more acute, particularly as the shape of airplane parts became more complicated and, therefore, more difficult to produce by existing methods. However, the aircraft industry was reluctant to adopt conventional methods, as the life of a part in production was seldom more than 3 months due to the constant design changes being made. As the volume was not sufficient to justify the use of iron and steel dies, nor the additional casting and forming equipment these would entail, the need for some intermediate material soon became clearly evident.

Necessity for solving these problems led to reopening the investigation of techniques and die materials which would permit the production of increased quantities on low-cost tools. Numerous experiments were made with drop hammers, with which the aircraft industry is largely equipped. Various metal alloys were tried out for dies as well as Masonite, plastics, rubber, and other organic materials. Some of these techniques and materials were used successfully and are still employed in special applications.

At the time, certain alloys were employed in the manufacture of body hardware and other articles by pressure die casting methods, which were stronger and tougher than either pure zinc or antimonial lead. In the search for new die materials, it occurred to one of the National Lead Co. subsidiaries (Morris P. Kirk & Son, Inc., Los Angeles) that similar alloys might be suitable for dies in drop hammers. Early tests showed encouraging results, which further investigation verified. A study was made of die requirements to determine what modifications were desirable in the com-



CUTS GRINDING TIME: In the plant of a large producer of die castings, 3/32-in. of scale and 3/32-in. of steel are removed from each side of vanadium steel impression blocks. Using 32 Alundum, (STEEL, Dec. 2, 1946 p. 104), made by Norton Co., Worcester, Mass., the company is said to be getting 6 days' production from each set and grinding time on each block 24 x 24 x 6 in. was cut 1¼ hours

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position of the existing alloys.

Resulting product was a zinc-base alloy, known as Kirksite, in honor of its discoverer. Because of its increased wear over similar materials, ease of working and stable characteristics, this material is now used widely in aircraft stamping dies. However, its full potentialities were not realized until the automotive industry began large-scale production of aircraft parts.

As stated previously the aircraft industry universally employed drop hammer methods in the production of airplane panels but motor car producers were equipped with conventional press equipment and, as immediate production was imperative, it was obvious existing equipment would have to be used. However, when conventional automotive methods were employed, utilizing conventional dies for forming and drawing panels, it was found that frequent design changes outmoded many of the dies after short runs. Not only was the amortization cost per panel prohibitively high but the production of superseding tools was too slow. It was known that the aircraft industry was employing dies in drop hammers; it was not known whether this material would be suitable for dies to be used in conventional presses. Accordingly, draw dies were designed for this material, with some skepticism. The results were so satisfactory that today there is no longer any doubt as to their suitability for drawing not only aluminum alloys, but also the harder materials, including stainless steel.

Cost Per Die Lower

As will be explained in detail later, processing zinc alloy dies requires little equipment, labor and fitting. Therefore, the cost per die is considerably lower. Additionally, the alloy in obsolete dies is nearly all recoverable and can be re-used so that the greatest portion of the expenditure for material can be looked upon as a capital investment rather than as part of the tool cost.

Kirksite A is a zinc base alloy which is shiny in appearance, close-grained, heavy in weight and strength, and has a stable shrinkage factor. It is similar to those alloys used in the die casting industry to form body hardware and many other parts. It contains roughly 3.5-5.0 per cent aluminum, 4 per cent copper, 1 per cent maximum of magnesium and the balance zinc. By the addition of aluminum and copper, ultimate tensile strength is increased from 5300 psi for pure zinc, to 37,800 psi for sand cast Kirksite. This may be said to approximate that of ordinary gray cast iron, which varies from 18,000 to 50,000 psi.

Sand cast the zinc alloy has a brinell hardness of 100 under normal cooling conditions, but it was discovered that this can be raised to approximately 130 if the casting is cold quenched after it sets and is still hot. This compares with brinell of 30 to 60 for zinc and 132 to 270 for cast iron.

Fundamentally, the founding of zinc alloy dies is a comparatively simple procedure, comprising die designing, pattern-making, molding, casting and finishing. Probably the most complex of these several steps is that of die designing, involving as it does the transformation and manipulation of metal, and requiring a knowledge of structure, stresses, and treatments, as well as experience in methods to avoid excessive finishing time, scrap losses and high tool costs. Pattern-making also calls for considerable care and involves principally fabricating a model or "mock-up," of which the outer or contact surface represents the panel to be formed. This is supported on a foundation, the walls and bottom being squared off to represent the base of the die. Patterns are made of wood, plaster or a combination of both.

Molding Operation

In the molding operation, the patterns are placed on a platform and surrounded by a flask. Sand is packed around the patterns and tamped firmly into position, whereupon a cover is attached, and the flask rolled over. When the platform base is removed, the pattern bases are exposed and they can be lifted out, leaving cavities in the sand whose contours necessarily correspond with those of the patterns.

Following this operation, molten Kirksite is poured through a gate cut into the open mold so that the metal enters the cavity at the lowest point. Pouring is continued until the mold is filled, whereupon it is allowed to set. After removal from the sand, quenching and cooling, the finishing operations of leveling off the bases of the casts and matching up the mating surfaces by removal of detected high spots, are performed.

The zinc alloy has a number of attributes which simplify these operations considerably. One is its low melting point of 717° F, which compares with 2500° F, or more, for cast iron, depending on carbon content. For this reason, no elaborate equipment is necessary to melt the alloy for pouring, only a comparatively simple gas or oil-fired melting pot being required. Fuel costs are low and castings cool quickly, becoming available for production in a matter of hours rather than days.

Another feature is that the shrinkage of cast zinc alloy is uniform (0.14-in. per ft). This means that the size of the casting can be predetermined with exactness and, as a result, elaborate profiling machines are not needed. In addition, the material is soft enough so that whatever machining is necessary to eliminate high spots and obtain matched surfaces can be performed quickly with electric or pneumatic hand grinders, or even with ordinary hand tools.

To obtain this result, it is necessary that patterns be made much more accurately than is usual in the case of other materials. However, due to these same characteristics, usually only one pattern of a pair of Kirksite die members is necessary, as a plaster cast of the opposite member can be taken directly from the first casting. One of the two plaster casts can be eliminated in some instances, by first casting the male member, coating it with iron oxide, and then casting the female section around it. This is the so-called "Kirk-on-Kirk" method.

Same procedure can be followed in casting draw or binder rings. It is sometimes possible to make a fence corresponding with the outer wall of the ring, place the cast punch (coated with iron oxide) in the center, and then cast a draw ring around it, either in plaster or metal, thus eliminating the necessity for a pattern entirely. The opposing ring, of course, is then formed in the same way as the second die member.

Whether a plaster cast is taken from the first die member cast or the metal poured around it, the number of patterns to be made is reduced and the molding operations are simplified. Not only does this reduce costs, but the closeness of the fit obtained by these methods greatly reduces the amount of machining usually necessary to match the die members.

Defects Remedied Quickly

While a properly designed and cast zinc alloy die set should stand up under moderate production requirements, when defects do occur they can be remedied quickly by re-surfacing, welding or metallizing. Also, where extreme stresses are anticipated, steel inserts can be locked in the zinc alloy casting readily to provide the necessary wear resistance. Finally the cost of recasting any one or all of the die members, if necessary, is within reason.

The alloy is supplied in ingots weighing around 25 lb and, as originally furnished, is made with zinc 99.99 per cent pure. This is an important factor for the inclusion of a fractional percentage of any of the soft metals such as lead, tin or cadmium causes intergranular corrosion and results in a loss of strength in the alloy over a period of time. This may mean a loss within 12 months of 33 per cent in tensile, and 75 per cent in impact strength. It is to overcome the corrosive tendencies of any impurities that the magnesium is added to the alloy. Iron also is a harmful impurity which will adversely affect the surface smoothness of the die, as well as increase shrinkage

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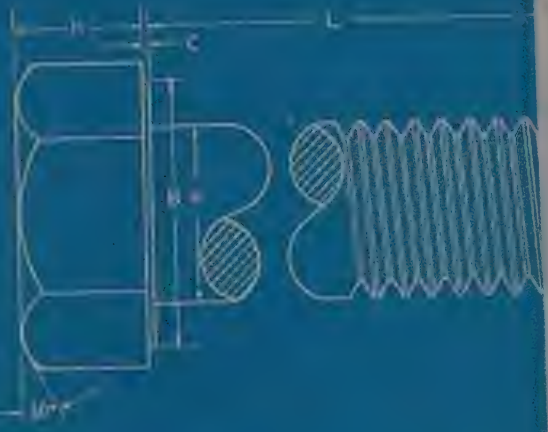

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"draws" at corners and vertical walls, and cause brittleness. This can be picked up from the iron furnace pot when melting the metal for pouring if the temperature is not controlled, or if the pot is not properly coated.

If normal precautions are exercised to exclude lead and iron, obsolete or worn Kirksite dies can be remelted, as the material will retain all of its original characteristics, and may be used over and over again. Dross loss, that is the loss in volume due to the removal of waste matter, refuse and impurities, should be around 2 per cent in operation and not to exceed 5 per cent in any event. While first cost of Kirksite is higher, the fact that it is at least 95 per cent recoverable offsets the original investment, and it may be viewed almost as a capital asset rather than an expense. In addition, there are savings in time and manhours besides reduced investment in tools and equipment.

Since the advent of Kirksite, the aircraft industry has made use of it for literally thousands of dies which were employed largely in drop hammer work. However, the alloy was used also in forming and drawing dies, blanking dies used in rubber squeeze applications, as molds for plastics, and as a material for tools, jigs and fixtures. The aircraft industry stamped not only thousands of aluminum alloy panels on such dies, but also many hundreds in Inconel and stainless steels. The latter represent some of the materials most difficult to work and have been processed in gages ranging from 24 to 16.

Fisher Body Division of General Motors made well over 8000 draw dies in Kirksite for use with aluminum panels, and stamped as many as 18,000 sill cover panels in 20-gage (0.037-in.) steel from one set of dies.

Refrigerator Cabinets Drawn

In one of the first experiments made by General Motors Overseas Operations engineers, some 600 lower front panels for a household refrigerator cabinet were drawn in 20-gage steel with a Kirksite die in a Detroit hydraulic press without noticeable impairment of the die components. Recently, a draw die for the second cross member in a 100-in. Chevrolet truck frame, was cast entirely in Kirksite. For experimental purposes, 585 units were drawn in 5/32-in. steel but this by no means represents the life of the die as evidence of wear was not excessive. Furthermore, by the addition of steel inserts at wear points, the die should be capable of producing thousands of such members, as the body of the die was entirely unaffected.

These examples point to a wide range of usefulness for the alloy in dies for panel work alone. Not only can the larger panels used in cabs, commercial bodies, and refrigerator cabinets be drawn, but many of the smaller pieces, plates, supports, braces and the like can be stamped as well. Finally, the dies can be, and are, used successfully in pressing other materials such as plywood and plastics. In addition to the die field, however, the alloy was found an excellent material for certain types of tools, jigs and fixtures. It is found that patterns can be made, and metal cast in these forms at far less cost and in much quicker time than would be required for fabrication by existing methods.

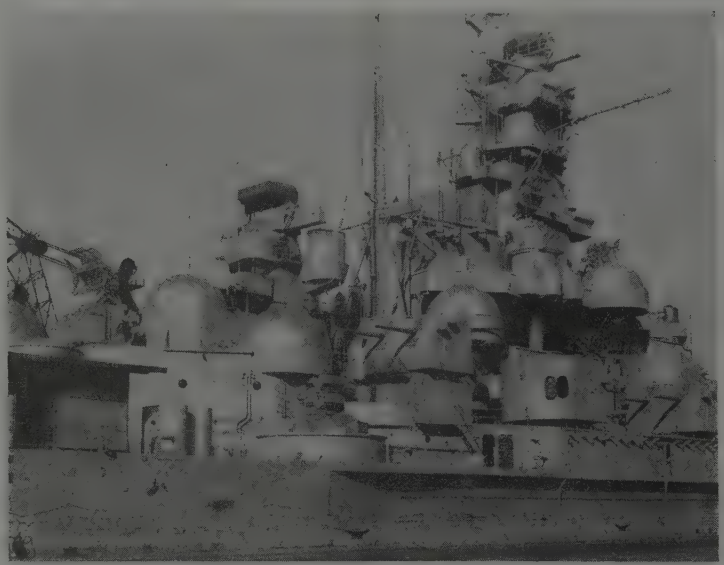
The alloy can be plated easily and the finish is excellent. As a result, it has distinct possibilities in the body hardware field. Grilles and grids have been cast in closed molds with excellent results and such parts are found to have both a fine finish when plated and good wearing qualities.

Facility with which the zinc alloy is cast, and the variety of forms into which the molten alloy will flow, make it a desirable material for experimental work. New parts may be cast for the purpose, first, of checking dimensions and fit, and second, to serve as samples for production. Grids, moldings, mountings and many other forms may be cast and plated for mock-ups of new models. Such applications are far less expensive than either machining out sample parts or having them cast in bronze or other material and then plated.

A direct comparison of cast iron and steel die costs with those of Kirksite is difficult to make, principally because of the differences in equipment investment and the far simpler procedure employed when Kirksite is used. Again, the comparison properly should be made with regard to pieces produced. Costs of die designing should be approximately the same. That is, the type of die used will be the same, although the construction may vary somewhat in order to compensate for differences in casting operations, temperatures, shrinkage, strength and other physical characteristics of the different metals.

Patterns are made to information contained on tool design drawings but with the correct shrinkage allowance to assure maintenance of dimensions upon solidification of the alloy in the mold. As the material has a constant predictable shrinkage value, dies can be cast practically to finished size but to obtain this result patterns must be made accurately. Also, it is common practice to provide in the casting chain lugs, eyebolt holes and other handling features.

Cost of both pattern design and pattern making, therefore, may be somewhat more when working with the alloy than with cast iron. On the other hand, it is common practice to use one Kirksite die member as a mold for casting its opposite member. The success of this practice is due to the shrinkage uniformity and accuracy of the finished casting. Through the elimination of patterns when this procedure is followed, both the overall pattern design and fabrication costs are re-



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Welded Steel Cuts Cost 27%

By C. D. Bonifield
Vice-President in Charge of Production
The Globe Company, Chicago, Ill.

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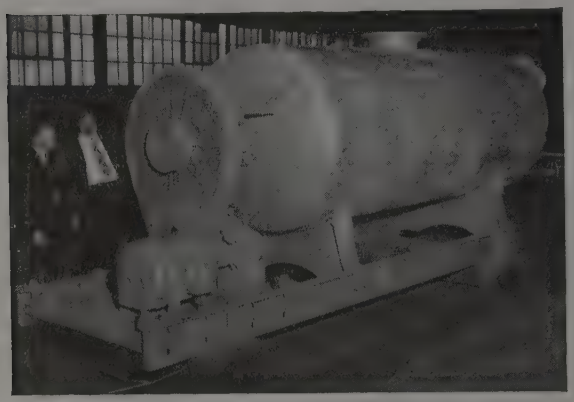

Fig. 1. Dry rendering cooker of welded construction.

One design which has been changed recently to welded steel construction is the saddle for the dry rendering cooker shown in Fig. 1. Two of these saddles support the welded pressure vessel on the welded base of this machine.

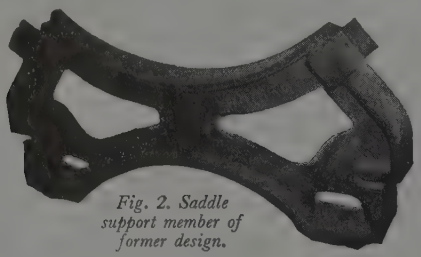

Fig. 2. Saddle support member of former design.

Fig. 3. Welded steel saddle costs 27% less than former design.

Fig. 4. Fixture used for assembly of welded saddle.

A saddle of former construction is shown in Fig. 2. The welded steel saddle, shown in Fig. 3, is produced at a total saving of 27% in cost over the former design.

The welded saddle, 60″ wide, 24″ high and 8″ deep, is fabricated from ½″ mild steel plate, consisting of four pieces, flame-cut and brake formed. The parts are assembled in the welded fixture shown in Fig. 4, which is placed on a work table in the flat position. After tack welding the parts together, the assembly is removed from the fixture and finish welded as shown in Fig. 5, with the saddle positioned for downhand welding of all joints. This requires continuous, two-pass fillets on both sides to join the flange to the web. The end pieces of the flange are butt-welded on both sides to the top flange assembly.

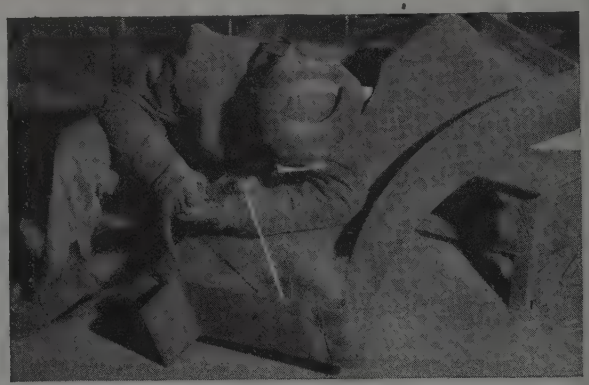

Fig. 5. Joints are positioned for downhand welding.

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duced without increasing the cost of other operations.

While the smallest cupola alone would cost perhaps three times that of the simple gas-fired furnace required for zinc alloy, the building requirements for a cupola installation are entirely different. The operational area is far greater, and larger storage areas would be required. Additional cranes, weighing and handling equipment would be needed. Because of the shrinkage uniformity of the zinc alloy, many costly finishing operations are eliminated. In addition, due to its easier workability, finishing can be accomplished largely with hand or portable power tools.

Since the alloy is cast at temperatures between 800 and 900° F, the molding department does not require special facing sands, refractory washes, etc., and there is no loss of molding sand through charring or burning. In fact, the only sand loss is in sweepings.

The end comparison of the material, of course, depends on the number of thousands of pieces required from the die. Despite the greater cost of cast iron and steel dies, it must be admitted at once that such costs are *justified* when hundreds of thousands of pieces are required. In this respect, the number of pieces to be expected from one set of zinc alloy dies is limited. However, it is quite possible to cast two or more sets of dies economically. There is no additional die or pattern designing cost; the same patterns may be used several times and the alloy in the worn dies can be reused. Therefore, the cost of two or more sets of zinc alloy dies still may be well under the original cost of conventional dies. This is particularly important, as even in high volume production most companies make duplicate dies to safeguard production against die breakdowns which would tie up the assembly lines for several days.

Alloy 90 Per Cent Recoverable

In considering the question of product cost there is doubtless a mean between volume requiring two or more duplications of the die components in Kirksite and the quantities that can be produced from one conventional cast iron or steel die. A final cost factor, of course, is the material itself. While the original cost of the alloy may be between two and three times that of cast iron, it is at least 90 per cent recoverable and with experience this loss can be reduced from 10 to 2 per cent. Reclamation of obsolete dies involves no expense as the dies are melted up in the same way as new ingots. To compare material costs, only 10 per cent of the original cost should be taken for comparison.

For low-volume producers there can be no doubt as to the lower costs of operation with Kirksite. Medium volume producers, having their choice between the two methods, may likewise favor the material because of its greater versatility and the simplicity of operations.

In presenting comparative costs of dies, it must be borne in mind that the zinc alloy dies can be made in areas where the making of dies from conventional materials could not be justified, requiring, therefore, that such dies if needed be imported from areas where generally wage rates prevail. As labor is a major cost in diemaking it is readily apparent that on this basis the difference in favor of zinc alloy dies made in overseas territories is greater than comparative costs (Table I) would indicate.

Pattern costs for the zinc alloy dies are slightly higher than for cast iron for the reason that the patterns must be more accurately made in order to reduce the cost of finishing the components. The great difference in cost is the amount of labor expended in machining and finishing the dies. As the cast iron dies used for comparative purposes were purchased in 1940, the wage rates prevailing at that time are used in estimating die costs.

Coolants

(*Continued from Page* 95)

1. Have good emulsion stability with waters of various types and hardness
2. Settle chips readily in the system
3. Resist rancidity, odor development, and deterioration
4. Resist foaming in circulatory service
5. Prevent formation of rust or corrosion on work pieces or machine tools.

Emulsion stability, deterioration, odor and contamination have already been discussed and will not be expanded on here. Foaming can be prevented by either or both of the following: Mechanical arrangement of circulation system to avoid excessive splashing of coolant; and use of foam depressants in the fluid. Severe rusting can be prevented by proper formulation of soluble oil bases and inclusion of rust preventives as additions. These methods of product improvement are known to reliable manufacturers and are utilized to furnish superior soluble products to the industry.

Drilling, Milling, Turning, Sawing: There are two broad classifications of soluble oils used in metal cutting, conventional and heavy duty. The former are used in emulsion form as coolants for such operations as drilling, milling, turning and sawing. The latter, the heavy duty types, contain—in addition to conventional emulsifiers plus oil—such components as fatty oils, fatty acids, special compounded mineral oils, chemically active additives and other agents. They are suitable for difficult machining operations ordinarily requiring active type mineral cutting oils, but where in addition superior cooling action is required. Such applications include broaching, heavy boring, hobbing, and heavy duty turning and forming. For these jobs six to ten parts of water to one part of soluble oil are used.

Both conventional and heavy duty soluble oils may contain foam depressants, rust preventives, germicides, water softening agents, and other additives to improve their performance. Emulsion coolants are not generally recommended for use in automatic screw machines or similar machines. Penetration of the emulsion into spindle bearings through ineffective bearing seals may result in displacement of lubricant and subsequent seizure and damage to spindles.

Paste-type compounds are not used to any such extent as soluble oils, in metal cutting coolants. However, they are used in grinding operations.

Coolants for Grinding: Metal grinding actually is a special type of metal cutting, the intricacies and problems of which are known to some extent by every tool and lubrication engineer in industry. No attempt will be made here to analyze grinding theories. We will attempt only to discuss the proper use of coolants in grinding.

Practically all cylindrical, centerless, and surface grinding of conventional machined pieces is done with water solutions or emulsions as coolant. Form and thread grinding, on the other hand, involve use of compounded mineral oils as cutting fluid and coolant. These last mentioned jobs represent special cases of application entailing special problems and product characteristics.

The grinding process requires certain properties in the coolant. In addition to those mentioned under the subject of metal cutting, the following are necessary in a grinding fluid:

1. It should have suitable "wetting-out" action to insure a continuous film on the work piece
2. It should not have any tendency to form gums or resins in use, nor load up the grinding wheel
3. It should settle chips, dirt, grits, etc., readily in the settling tanks to avoid carry over and scratching of the work piece
4. It should resist rusting tendencies even in very dilute emulsions used in grinding.

"BRAINS" FOR ELEVATORS: Uncanny electrical "brains" of modern high-speed elevators are assembled along this aisle at the Westinghouse Elevator Division, Jersey City, N. J. Delicate relays mounted on the panels respond to "nerve" impulses of current from the operator's push button, and pass along the impulse in a split second, controlling the generator which runs the driving motor

5. It should not affect the bonding material of the wheel
6. It should—for some types of work—be of clear, translucent appearance so that work in process can be observed.

To meet these requirements several types of grinding fluids are available. They are: (1) Soluble oils to produce opaque emulsions, (2) soluble oils to produce translucent emulsions and (3) grinding paste-type compounds.

Any of these may contain wetting-out agents, foam depressants, water softening additives or rust preventive compounds. All are mixed with water in proportions from about 40-100 parts water to one part oil or compound, and are used in the emulsion form as the coolant.

The opaque, milky white emulsion is the one most commonly used. It generally is made up from soluble oil, although paste type compounds of the unpigmented variety also are used. As coolants, such emulsions are inexpensive, efficient for many kinds of grinding work and, if properly formulated, cope with most difficulties encountered such as water condition, ordinary contaminants, mixing problems, and operating requirements both on rough and finish grinding jobs.

Translucent grinding emulsions, prepared from special soluble grinding oils containing a high proportion of emulsifier base, are particularly adapted for use in fine finish grinding to close tolerances. Possessing all the normal attributes of a good grinding coolant, they have in addition the advantage of permitting the operator to observe at all times the condition of things at the point of contact between wheel and work. This is important when the wheel is being brought to the work. With opaque coolants, the operator cannot see through the cascade of liquid. Because of this he may be forced temporarily to shut off the coolant flow, and that is very apt to cause burning and resulting damage to the work finish.

Although in concentrated form high soap content soluble oils of the type that form translucent emulsions cost more than ordinary soluble oils, they actually cost less in emulsion form at the machine. This seeming paradox is explained by the fact that due to their special formulation they ordinarily can be diluted for use with almost twice as much water as could be added to conventional oils. While the latter are usually mixed with from 20 to 40 parts of water, translucent type soluble oils operate successfully with from 70 to 100 parts water.

Their operating superiority for precision grinding also makes for economy in consistently better production and better finish, which means fewer rejects. They combine the transparency and low surface tension of cheap sal soda solutions with the good rust preventive, nonfoaming character of modern soluble oils. They do not attack resinoid or shellac-bonded wheels as is apt to occur with sal soda solutions. The latter also is liable to affect paint on machines and to contribute to operator skin and eye ailments, if in too strong solution.

As already mentioned, paste-type compounds are used to some extent in preparing coolants for grinding. These should be of a high soap type for best results. They may contain some fatty oils which impart lubricating film properties. However, an excess of fatty oils in the emulsion may contribute to "loading" of grinding wheel and gumming up of the system. Also chip settling may be slowed down by too high a fatty content.

Paste-type compounds usually are mixed with several parts of water, preferably hot water. This mixture is agitated thoroughly to produce a heavy slurry which in return is diluted with 70-150 parts of water for use as a grinding coolant. Since soluble oils are much more easily mixed for service, many operators prefer them to the pastes. However, when dealt with as just set forth pastes are being used with excellent results.

Coolants for Metal Rolling: Rolling is the third class of metalworking operations wherein coolants are employed. This is a broad subject, so for brevity, only a few comments will be made here. Water, water solutions and emulsions all are used widely as coolants of both ferrous and nonferrous metals.

Hot steel ingots and blooms are rolled in mills wherein the rolls are cooled by water spray. Cold reduction of continuous steel strip in tandem mills is accomplished by using either the single or dual system for coolant distribution. With the single system, an emulsion of soluble oil, palm oil, and water is applied to rolls and strip by spray nozzles, the emulsion being caught and recirculated for continuous use. Usually this emulsion contains about 1 part soluble oil to 20 or 30 parts water, together with a small percentage of palm oil. The emulsion temperature is usually maintained at about 150° F to prevent separation in service. Although mineral oil and other types of oil have been tried and in some cases are used, the majority of steel rolling continues to be done with palm oil solutions.

With the dual system, mineral oil or palm oil is sprayed on the steel strip for lubrication, and water in large quantities is sprayed on the work and back up rolls for cooling. Sometimes the oils are applied "neat," as purchased. In other cases they are mixed with an equal volume of water before application. While some of the oil may be salvaged for reuse in the dual system, most of it is lost down the drain with the cooling water.

There are a great many factors to consider in the application of rolling fluids and rolling mill coolants. Some of these are: Friction characteristics, strip finish, per cent reduction, rolling speeds, mill sizes and types and power

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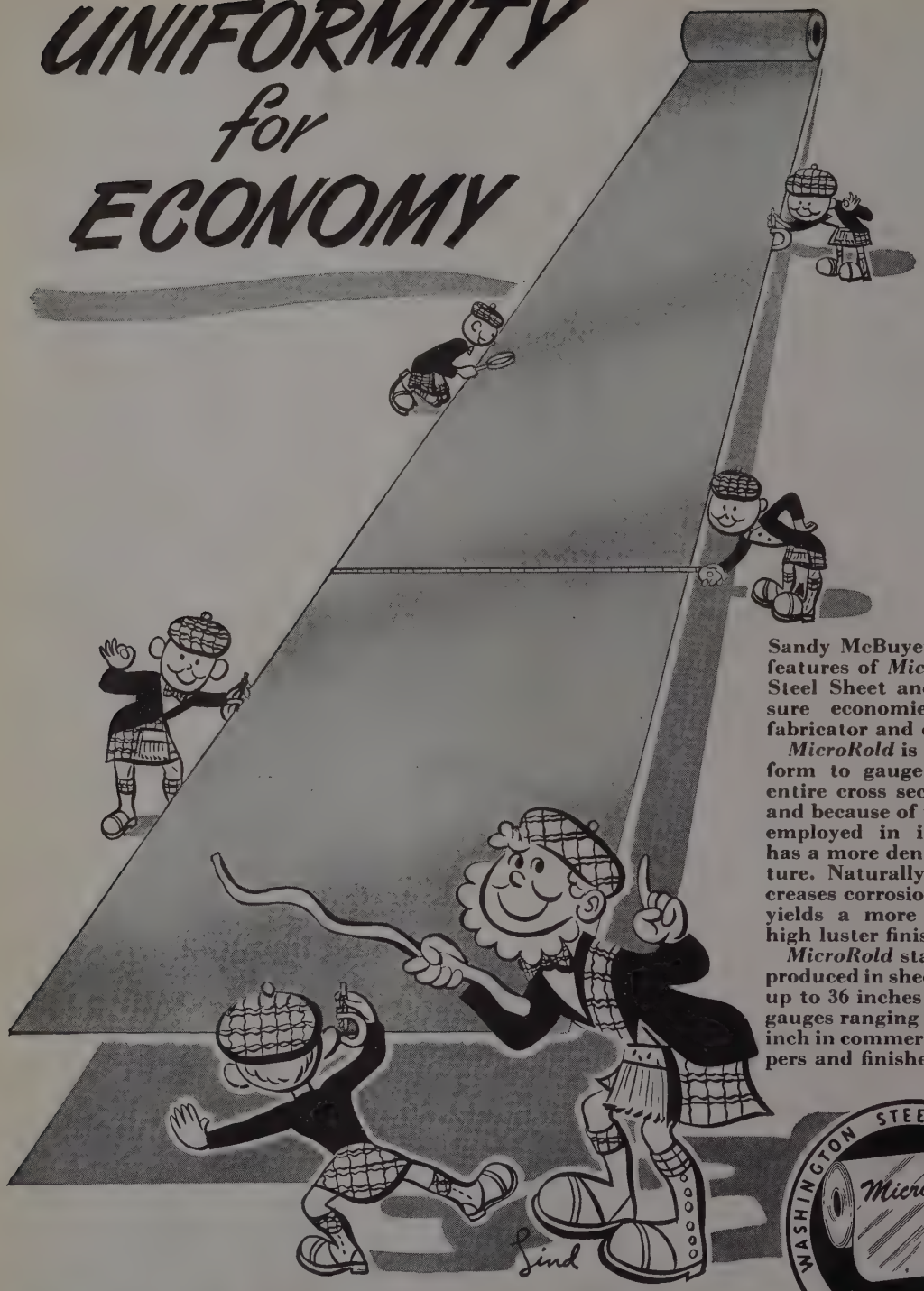

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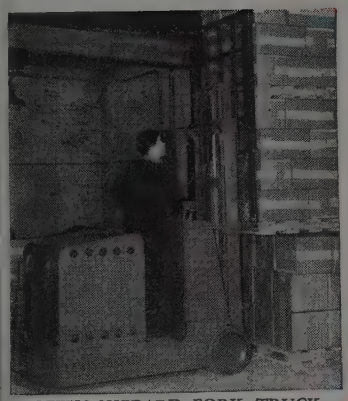

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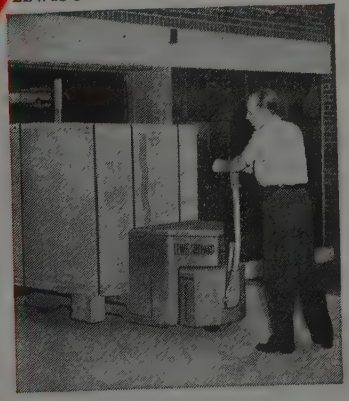


considerations. Unfortunately, this paper cannot, for space reasons, treat any of these subjects.

In aluminum rolling, hot reduction of ingots usually is accomplished with the help of an emulsion-type coolant. This emulsion may be a soluble oil of the opaque kind mixed with 20 to 30 parts of water. It is sprayed on the work rolls for cooling. Since aluminum is critical to Ph values beyond a narrow range either side of the neutral value, and is subject to water stains, emulsion-type coolants are not satisfactory for cold reduction of finished strip. Generally, light viscosity compounded mineral oil is employed in this operation as a strip lubricant and roll coolant.

In copper and brass rolling, compounded mineral oils likewise are used for most alloys and finishes. These oils are sprayed through nozzles onto the work strip, while water is used for roll coolant. Various viscosities and types and degrees of compounding are employed, depending upon the specific job requirements.

There are cases where soluble oil emulsions are utilized for brass rolling, particularly where bright finish is desired. Since emulsions do not have the lubricating value of compounded mineral oils, they tend to produce this bright, burnished finish. They offer the advantage of low cost as compared to mineral oils, which naturally is a factor influencing their employment. Such emulsions are the conventional opaque type. They usually are made by mixing 20 to 30 parts of water with one part of soluble oil. The exact concentration adopted, as in the case of all rolling applications, is determined by consideration of roll slippage versus sheet finish desired.

Coolants for Metal Drawing: Application of coolants in metal drawing is the fourth and last subject in this article.

Use of paste type compounds is traditional in this branch of industry, although soluble oil emulsions and mineral type compounded oils are finding increasing favor in many new applications.

The manner in which drawing compounds are prepared for use, and the way in which they are applied, depend largely on the type of drawing to be done. The most important factors in selection of suitable compound are as follows:

1. Type of metal to be drawn—that is, ferrous, nonferrous—and physical properties thereof
2. Nature of drawing operation, including severity of draw, per cent reduction, work shape, and annealing practice between draws
3. Method of applying coolant or compound, as for instance:
   (a) Circulation system
   (b) Dipping bath method
   (c) Spray application
   (d) Swab application

The drawing compound, emulsion or coolant in drawing operations serves to cool and lubricate dies and work. This minimizes die wear and insures proper finish on drawn work by eliminating metal pickup, welding of foreign particles on the surface of the work, scratches, tears and fractures. With suitable compounds, frictional heat in drawing is reduced materially, thus preventing excessive thermal expansion of dies, mandrels, punches and work. If not so controlled such expansion may result in off size work and shortened service life of the die setup.

There are three major groups of drawing operations which are employed in drawing of all types of metals, both ferrous and nonferrous. These are: (1) Wire drawing, (2) tube and bar drawing and (3) press drawing, stamping and blanking.

Wire drawing is done either on bench type machines—generally used for rod breakdown and heavy wire draws—or any one of several widely used high speed, enclosed multi-die machines. The latter are used for intermediate and fine wire drawing, both ferrous and nonferrous. Circulation system application of coolant prepared from compounds is the general practice in the so-called "wet-wire" method.

For steel wire, a soap fat concentration of 1 to 3 per cent in the coolant is maintained. Temperature of the coolant is held at 100-150°F. For copper and copper alloy heavy wire drawing and rod breakdown operations, soap fat concentrations of 3 to 6 per cent are used in coolant at 140-160°F. For fine copper wire drawing (sizes below B. & S. Gage No. 36) a much more dilute coolant made from a high soap content compound is preferable. Soap-fat concentration is maintained at 1 to 2 per cent with coolant bulk temperature at approximately 90-110°F.

If too much fat or too rich an emulsion is tried on high-speed fine wire machines, sticky black deposits form on the wire at the dies causing wire breakage. However, if soap content is allowed to become excessive, foaming may result. Experience has indicated the proper balance in proportion of these components and correct dilution of optimum results.

Aluminum wire now is coming increasingly into prominence. Its drawing requires a compounded type mineral oil circulated through the dies at a bulk oil temperature preferably under 150°F. The viscosity of oil used is based on severity of draw and size wire, heavier oils for heavy wire, light oils for fine wire.

Tubes and bars of all types of metal are drawn on draw benches operated either mechanically by a chain pull, or hydraulically. Customary practice is to dip the tubes in a heavy emulsion of drawing compound, then allowing the coating to dry to a certain extent before drawing. Steel tubes in some cases are coated with lime to facilitate drawing. Concentration of soap-fat in the emulsion is held between 15-25 per cent and temperature of dip bath kept at from 120-160°F. Copper and brass tubes for drawing follow a similar procedure but never are lime coated. Sometimes oil is circulated over the die.

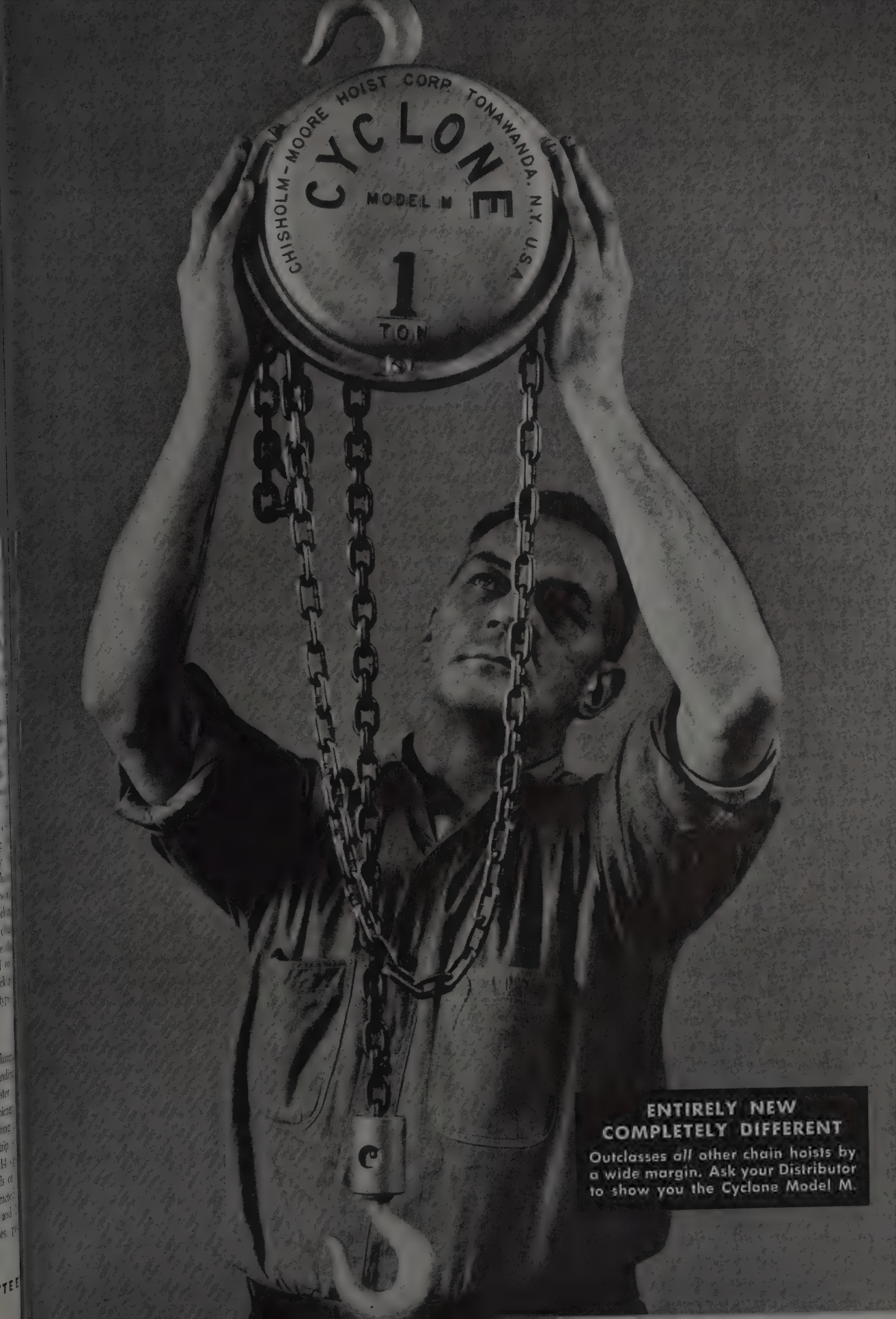
Steel bars usually are pre-coated with lime, then drawn through a die over which mineral or fatty oil blends are circulated. Aluminum tube drawing requires circulation of oil over the die and also through the mandrel. In some cases water soluble oils are applied straight. This permits subsequent cleaning with water and eliminates the need for solvent-type cleaners used in connection with mineral oils.

For heavy draws both of ferrous and nonferrous tubes, pigmented compounds may be used to furnish the benefits of solid lubrication and to avoid metal pick-up, surface scratches and premature die failure. Heavily pigmented products never should be used in circulation systems. The pigment settles out and clogs horizontal pipe lines in the system.

Press drawing, stamping and blanking operations usually entail the spray or swab application of an emulsion containing from 15-30 per cent soap-fat or solids. Both pigmented on nonpigmented compounds are used, depending upon severity of draw and subsequent cleaning procedure. Aluminum drawing compounds contain high free fatty acid content. Don't use alkaline solutions. They attack aluminum surfaces. The fatty acid imparts good wetting-out characteristics to the emulsion. Such characteristics are highly desirable, since aluminum is much inclined to weld on to drawing dies and to produce pickup of foreign particles, when this type of emulsion is not employed.

—o—

An inexpensive method of clamping, splicing, tying, mending and banding is possible with the Clamp-Master kit offered by Punch-Lok Co., Chicago 7. Kit contains a tool for tensioning and locking all clamps, 31 flat strip steel clamps of assorted sizes, and 14 open end clamps for use where ends of objects to be clamped are obstructed. It is suitable for use on high and low pressure hoses, breaks in pipes, posts, ladders, rails, handles.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TRENDS IN STEEL INDUSTRY

DATA presented by speakers at the fifty-fifth general meeting of American Iron and Steel Institute in New York, May 21-22, reflect advancement in the design and operation of blast furnaces and rolling mills, and reveal some pertinent statistics dealing with iron ore reserves and the supply of merchant iron. An abstract of the various papers follows:

Seamless Pipe Mill: Economies which will be effected at a new seamless mill at Lorain, O., will result in the production of rounds direct from the ingot without intermediate heating as a separate step, states E. N. Sanders, vice president, operations, National Tube Co., Pittsburgh, in his paper "Progress in Steel Pipe Manufacture with Particular Reference to Seamless Pipe."

Alterations made in the piercing mill roll pass permits the use of larger diameter rounds than heretofore suitable for a given pipe size. Increased rate of production in the blooming and bar mills has been particularly effective in reducing the cost of rounds required for the manufacture of small diameter pipe.

To overcome objectionable features of the conventional seamless mill furnace, and to eliminate manual handling of the billets in the furnace, the rotary hearth billet heating furnace will be employed. Improvements in the quality of heating, reduction of labor, and a reduction of 65 per cent of the scale loss formerly incurred, represent the most attractive features of the rotary-hearth furnace. This reduced scaling reflects a 2 per cent saving in the overall cost of material.

Without changing the roll surface speed or the feed angle, modifications made in the piercing pass have increased the speed of the piercing mill 100 per cent. Development in piercing pass design makes it possible to use lower cost steel, and has increased the productive capacity of the piercing mill.

Overall wall reduction which will be made in the continuous rolling mill is about twice that now made in the conventional 2-high mill. As a result of this increased wall reduction the productive capacity of the piercing mill has been stepped up.

Coating Materials: C. A. Ingenfritz, vice president, purchases, United States Steel Corp., Pittsburgh, in speaking on "The World Situation on Coating Materials—Lead, Zinc, Tin," mentioned that this country has about 14 per cent of the world's lead ore reserves which, it is estimated, will last only 12 years based on the 1935 to 1939 annual rate of consumption.

This country is accredited with about 19 per cent of the world's zinc ore reserves. It is estimated these reserves will last 19 years at the 1935 to 1939 annual rate of consumption. From 1937 to 1939, this country produced 30 per cent of the world's output of zinc.

Zinc supplies are tight and likely will continue scarce as long as domestic consumption stays at the existing high level and until production in foreign countries picks up. Lack of fuel is holding production in Belgium to about 75 per cent and in France and Norway to about 50 per cent. Higher prices abroad are attracting zinc from Mexico which normally is shipped to American users.

World tin production is improving but progress will be slow. The 1947 output is estimated at 50 per cent of the prewar rate and while 1948 will show continued improvement, full production is not expected before 1949. Meanwhile, it probably will be necessary to continue some restrictions in tin uses.

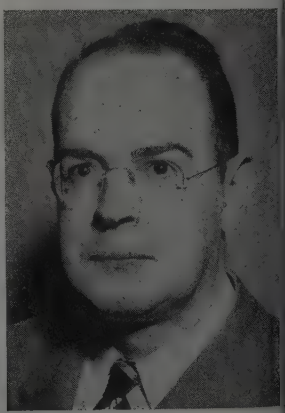
Blast Furnace Bell: Segregation of sizes has added to many of the difficulties encountered in properly distributing ore containing an assortment of size particles, according to T. H. Kennedy, assistant general superintendent, National Works, National Tube Co., McKeesport, Pa., in speaking on "Blast Furnace Bell Development."

It is believed that the first actual installation of apparatus designed to maintain a proper gas flow distribution is that of the serrated bell installed on National Tube Co.'s No. 1 stack at McKeesport, Pa., June, 1944. This bell is in all respects similar to the conventional bell except for the serrated section below the hopper seat and the mechanism for radial movement which is attached to the top of the bell rod.

E. N. SANDERS

C. A. ILGENFRITZ

T. H. KENNEDY



E. L. ROBINSON

It is designed for 10° radial movement on each closing stroke of the bell or 60° from crest to crest in six successive dumps of the bell, thus forming a series of serpentine or sinuous ridges adjacent to the furnace wall. Because of velocity gained in sliding over the long overhang the depth of the serration in ore ridge is about double that of bell.

This mechanism has rendered satisfactory service for almost three years. The furnace has consistently demonstrated ability to take more wind per sq ft of hearth than the other furnaces. Flue dust losses, good product yields and coke consumption compare exceedingly well with other furnaces of about the same size.

Statistical Methods: E. L. Robinson, assistant chief process metallurgist, and L. G. Eckholm, head of metallurgical department development group, Carnegie-Illinois Steel Corp., Pittsburgh, in their paper on "Selection and Application of Statistical Methods to Steel Plant Processing Problems," submit reasons why it is necessary to go beyond the traditional methods and indicate that in so doing there are certain essential precautions that must be observed.

The authors presented only a few of the many statistical methods available. Each type problem requires a different mode of attack, they explain. The reader is led through their elementary study to illustrate that data secured from industrial processes must be handled with an adequate knowledge of the process and with the proper selection and correct application of sound statistical methods, or the results will be incorrect. Similarly, good judgment and experience dictate that the results must be capable of a rational explanation.

Industry will realize the benefit to be gained from the use of modern methods of statistical analysis only when it recognizes the dangerous conclusions which can be drawn from inadequate statistical analysis and demands the proper selection of statistical methods and their intelligent application to industrial processing problems.

Finishing Steel: Today there is a special sheet for practically every special use, according to the paper "Finishing Steel for Decorative and Protective Purposes," presented by Reid L. Kenyon, associate director, Research Laboratories, American Rolling Mill Co., Middletown, O.

It is of interest that 37 per cent of the 800,000,000 lb of synthetic resins produced in 1944 was used as decorative and protective coatings for wood, steel and other metals. This was the largest single use of these materials. The paper pointed out that developments in the paint and varnish field just before and during the war indicated that synthetics will become even more important in metal finishing in the postwar period.

More extensive use of hot dipping can be expected, although this is at present confined to ethyl cellulose strippable coatings. An entirely new method of coating is that of using low-melting synthetic resinoids without a solvent by spraying from an electrically heated atomizer.

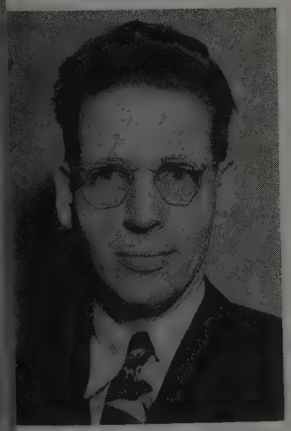
Hot dipped aluminum coatings are now being used for the protection of steel under more severe corrosive conditions, especially at elevated temperatures. When used for auto mufflers and stoves, they withstand temperatures up to about 900° F. without discoloration. In some fields, such as refrigerator cabinets and signs, there is competition between porcelain enamel and organic coatings. In an effort to meet this there is a trend in porcelain enamel toward fewer and thinner coatings. These new enamels have higher opacity and greater light reflectance, while fewer coatings reduce the number of firings.

Stainless steel can be embellished in various ways and since the metal is so enduring some artists have used it as a medium for their work. Starting first with simpler treatments, a two-tone effect can be obtained by using high and low luster finishes. A rather novel effect can be achieved by peening or shot-blasting under controlled conditions.

Supersonic Testing of Steel: At the present state of supersonic inspection, flaws are detected by sound shadows and sound reflections they produce when exposed to high frequency sound radiation, according to the paper presented by R. R. Webster, research engineer, Jones & Laughlin Steel Corp., Pittsburgh. Size of these shadows or the intensity of the reflection is a guide in determining defect size, he stated. Also, the development of radar-like techniques used in conjunction with reflection work has given a degree of stereoscopic vision or depth perception.

The supersonic method is applicable to the detection of defects such as pipe, blowholes, porosity, deep cracks and laminations in wrought and cast steel. As it can be used on large sections, it makes possible the nondestructive testing of such products as blooms, rolls, die blocks, etc., which are not considered amenable to x-ray testing.

One of the systems used in testing steel with supersonics is the "thru" or "shadow" method. This depends on the ability of a defect to cast a sound shadow in order to be detected. According to the paper, a variation of the method now is creating considerable interest at this time in that it can be used for continuous testing of materials with regular cross sections such as strip. Another method for applying



L. G. EKHOLM

R. L. KENYON

R. R. WEBSTER

C. W. STAHL

supersonics to steel makes use of the reflection of supersonics from defects, and the principal operation is similar to that used in radar sonic depth sounding.

Improving Coke Strength: In his paper, "Experiments to Improve Coke Strength," C. W. Stahl, research engineer, Bethlehem Steel Co., Bethlehem, Pa., pointed out that tests confirm that coal quality is the most important variable affecting coke strength. This was shown in a series of tests on nine different coal mixtures pulverized 85 per cent through ⅛-in. screen. The tests produced cokes which differed in stability index from 30.5 to 44.6.

It appears from numerous tests that finer pulverization results in a greater percentage benefit in coke strength when applied to poorer coking coals. For example, one coal mixture containing 10 per cent ash, pulverized 80 per cent—⅛-in. produced a coke with a stability index of 48, compared to 58 when pulverization was increased to 100 per cent through the 1/12-in. screen. Another series of tests on a different coal mix containing about 10 per cent ash showed an index of only 25 when pulverized to 80 per cent through ⅛-in. Thus, the former coal if pulverized 90 per cent through the ⅛-in. screen would probably yield a coke equal in strength to that produced from the latter coal pulverized 100 per cent through the same screen.

At present, the author said, we are trying to correlate coke strength and blast furnace operation at one of our plants. This is being done by observing the operation of a single furnace for two 30-day test periods, sampling and testing all materials in and out of the furnace. Another variable being studied is the effect of coke size on strength. We have data from recent tests which indicate that the probability of breakage in the furnace of large coke pieces is many times greater than that of smaller pieces of 2 to 3 in.

Mill Design for Rolling: J. J. Curtin, superintendent of rolling mills, Bethlehem Steel Co., Lackawanna, N. Y., indicated in his paper on "Design of a Mill for Rolling Semifinished Products," that an operator must consider the following factors: Size of product to be rolled, source of steel supply, quality of product and tonnage required. After these factors are established, features of design can be considered, bearing in mind that these conditions must be met at the lowest possible cost. Here a certain increase in installation cost may be offset by lower operating cost.

Where a mill is supplied directly from a blooming mill and where the entire output of the bloomer is to be rolled, he stated, the mill capacity should be slightly higher—10 per cent or so—than that of the blooming mill. The semifinishing mill must be designed to accept this bloom size and roll it to the desired section.

Each of the three basic semifinishing mill types—continuous, crosscountry and 3-high billet mill—has a specific place in industry. Regardless of the type mill, the chief requisites for practically all semifinished tonnage is freedom from surface defects, reasonable accuracy in size and weight of sections, and straightness of product.

Training Metallurgists for Industry: Like all industries that have their roots in technology, the steel industry has for several years experienced an acute shortage of technically trained personnel in the younger brackets. In spite of the best efforts of the engineering schools, where the enrollment has jumped from a prewar average of less than 100,000 to a total of 223,000, it is conservatively estimated that the current deficit in engineering graduates cannot be liquidated earlier than 1952.

John Chipman, professor in charge, department of metallurgy, Massachusetts Institute of Technology, as stated in his paper "Training of Metallurgists for the Steel Industry," is of the opinion that the dual nature of metallurgy requires that its students be trained in both science and engineering. This requirement and the traditional limitation of the college course to 4 years have posed real problems to educators.

Largest block of studies is in the sciences—mathematics, physics and chemistry. These occupy 38 per cent of the student's time. Mechanical and electrical engineering and graphics take 15 per cent of the schedule, leaving approximately 30 per cent for instruction in metallurgy, and 17 per cent to history, English, etc.

Most important feature of this background is the fundamental nature of the subjects covered. The curriculum contains nothing "applied," nothing "advanced," or "specialized." The fundamental, basic subjects are no less essential to the training of a metallurgist than is metallurgy itself.

Future Iron Ore Supply: What tonnage of yearly iron ore requirements for this nation in the future shall we estimate? What are our reserves to supply such a consumption? These two questions were answered by George W. Hewitt, assistant vice president in charge of operations, Wheeling Steel Corp., Wheeling, W. Va., in his paper, "Iron Ore Supply for the Future."

Based on past experience, and with a view to our national way of life and our position in international affairs with its many responsibilities, Mr. Hewitt feels that it does not now appear unreasonable to think of an average normal yearly consumption by this country of around 90 million tons of iron ore. Of

J. J. CURTIN

J. CHIPMAN

G. W. HEWITT

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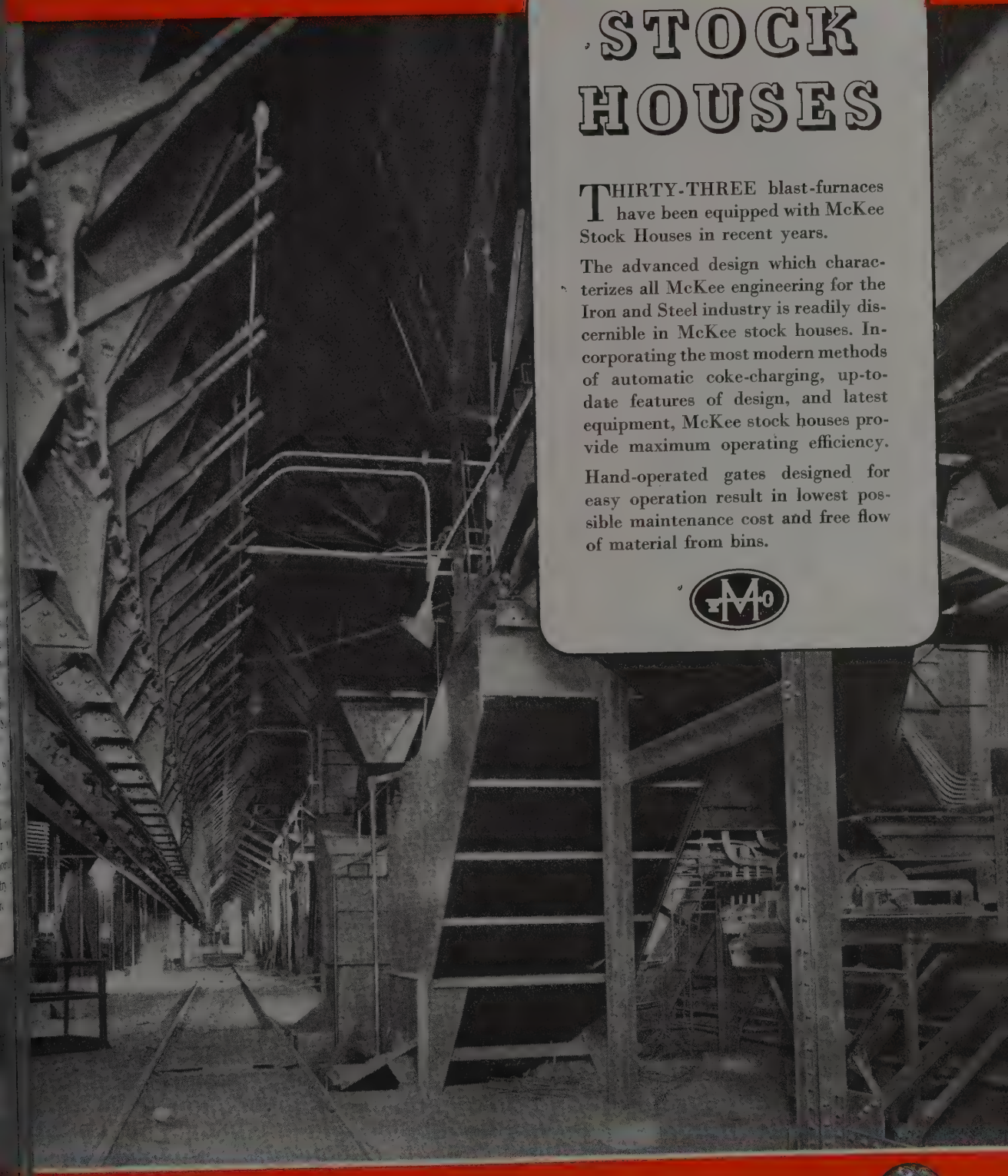

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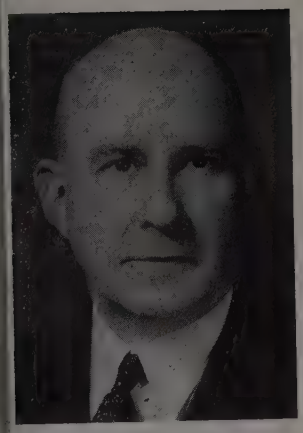
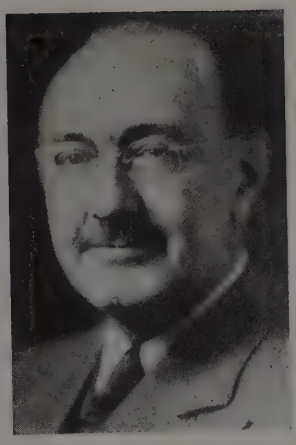


B. S. STEPHENSON

W. E. MARSHALL



G. V. SLOTTMAN

F. B. LOUNSBERRY

this, the demand upon Lake Superior reserves would be around 70 million tons. For long-range calculations, making allowance for possible depression periods and some increase in shipments from other sources, we might justifiably take a figure of 60 to 65 million tons yearly for average future requirements from U. S. Lake Superior districts.

Reserves in the United States are estimated at somewhere between 4 and 5 billion gross tons, of which Minnesota, Michigan and Wisconsin comprise about 1½ billion tons. Outside of Lake Superior, these are approximate figures, being really skillful guesses based on only partial definite information since exploration of the other deposits is far from complete.

With regard to beneficiation, extensive capital investments must be made in starting and upbuilding to a tonnage of consequence the production of concentrates from Lake Superior taconites. It will take time to construct and try out initial concentrating plants and then build others to carry the increasing proportion of our large national demand.

Joliet Coarse Rod Mill: Designed for high production of rods from 2½ x 2½-in. x 30 ft billets, the Joliet, Ill., coarse rod mill of American Steel & Wire Co. was described by R. R. Snow, division superintendent, hot mills, as being the equivalent of two ordinary billet mills.

The Joliet mill is capable of rolling a range of rod sizes from 11/32 to 55/64-in. in bessemer, basic open-hearth and electric furnace steels. During 1946, it produced approximately 179,000 tons of rods. Overall billet to rod yield averages about 93 per cent.

Unusual feature of the mill is that it is built 14 ft above grade, allowing ample room on ground floor for offices and equipment. Mill proper consists of five 16-in. roughing stands, six 14-in. intermediate stands and two 12-in. finishing stands arranged in tandem, followed by a large and a small repeater which carry the finishing squares to two separate 12-in. finishing oval stands. Two oval repeaters then carry the finishing ovals to two separate 12-in. finishing round stands.

The Outlook in Merchant Pig Iron: In a paper packed with pertinent statistics, B. S. Stephenson, president, Tonawanda Iron Corp., North Tonawanda, N. Y., summarized the outlook for merchant pig iron in the light of present conditions. As long as iron, steel and foundry industries hold at or even approximately near their present rates of operation, merchant iron will be critically short.

Even allowing for some shifting of blast furnace capacity from steelmaking and alloy grades, the available tonnage of merchant iron will not sustain a production of gray iron and malleable castings much, if any, above the rate recently attained. Continuance of the current acute scarcity of scrap for both steel plant and foundry use will only serve to prolong and accentuate the present shortage of merchant iron.

A total of 33 blast furnaces comprises the list of what may be termed completely merchant, in the sense that their full production regularly is "for sale." Of these, 26 or 27 normally operate on pig iron and 6 or 7 on ferroalloys. Their combined rated capacity is 5,500,000 tons per year.

Blast Furnace Calculations: In his paper on "A Method of Estimating Blast Furnace Production and Coke Consumption", W. E. Marshall, supervising metallurgist, American Rolling Mill Co., Middletown, O., submits the question: What might be the effect of a considerable change in operations on production?

Although development of the simultaneous equations used in the method of calculation is rather laborious, once this has been done and the results accepted, their application to a problem is relatively simple.

The author submits a method for calculating coke burned at the tuyeres per ton of pig iron produced without the use of the blast volume per ton of iron, an extension of the method for estimating production of revised processes by comparing them to the standard process and then presents an application of equations to a problem.

Here is a paper that blast furnacemen will want to keep close at hand.

Application of Oxygen: To obtain consistent results in decarburizing with gaseous oxygen, particularly in low carbon ranges, it is essential to control the rate of oxygen supply, the percentage of effective blowing time, the volume of metal to slag and the slag basicity, according to G. V. Slottman, manager, technical sales division, Air Reduction Co. Inc., New York, and F. B. Lounsberry, vice president and technical director, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Saving in time per heat has varied from 2 hours to 4 and 5 hours depending upon the type of heat melted and the end point desired. Indications are that the saving in the cost of iron ore required plus the cost in fuel saved will more than offset the cost of oxygen used to accomplish the same result, leaving the increased tonnage obtained per production hour worked as clear gain.

An advantage in the use of oxygen versus iron ore is the effect on yield from metallic weight charge to ingot weight cast. The overall average is about 2 per cent increase in yield using oxygen versus iron ore in making over 600 heats.

Production experience with this new method of carbon reduction is that tonnage increases in the order of 25 per cent; equal or better steel quality and an increase in yield are obtained as compared with former slag-metal practice.

Fabricating Problems: Melting of high-

temperature alloys presents no unusual difficulties, according to G. Mohling, associate director of research, Allegheny Ludlum Steel Corp., Brackenridge, Pa., in speaking on "Problems Involved in the Fabrication of High Temperature Alloys." To secure sound ingots a nonconsumable electrode are has been used successfully on the top of the ingots.

Forging furnaces are oil or gas fired and closely controlled as to temperature and atmosphere. The latter is kept slightly oxidizing to prevent carburization. If the surface of the ingot is somewhat rough, it may pay to grind before forging.

In the rolling mill reductions in standard passes were found to be too drastic. So-called hand round passes are used and this rolling has been done at relatively low speeds. Sizes under 1-in. are being rolled in standard passes.

Cast alloys of the same chemical composition show generally better properties than wrought alloys at temperatures of about 1500° F or more.

Rolling Practice: In his paper on "Shaping and Forming," W. Trinks, professor emeritus, Carnegie Institute of Technology, Pittsburgh, points out that each particle of a plastic mass always moves in the direction of least resistance. In almost all practical cases, conditions are so complicated that the man in the forge shop or rolling mill must use his judgment to determine the direction of flow.

In the drawing of tubes, with or without a mandrel, the inside of the tube becomes polygonal. An Austrian engineer rolled shallow grooves into those parts of the tube which lie at the parting of the rolls in the succeeding pass. Size and shape of the groove are such that the spreading just fills the groove without causing a fin.

Making cold mill working rolls extra hard raises their elastic limit, but does not reduce the roll flattening. The latter is a function of the modulus of elasticity which is the same for soft and hard steel.

Specifications: Study of cooling rates and time and the use of the end quench hardenability test are resolving the selection of an alloy steel into more of a science and less of an art based on experience, stated D. H. Ruhnke, chief metallurgist, Central Alloy District, Republic Steel Corp., Massillon, O., in his paper "Appraisal of Hardenability Band Specifications for Alloy Steel."

By allowing the steelmaker a small increase in the carbon, manganese, nickel and chromium ranges, it has been agreed to supply a product more closely controllable from the standpoint of hardenability than when specifying standard chemical ranges.

G. MOHLING

W. TRINKS

D. H. RUHNKE

One of the first reactions by steel users to the H-bands was that the spread between minimum and maximum lines was too wide. Need for reasonable close control of hardenability is appreciated by steel producers, particularly since the introduction of high production and continuous heat treating equipment.

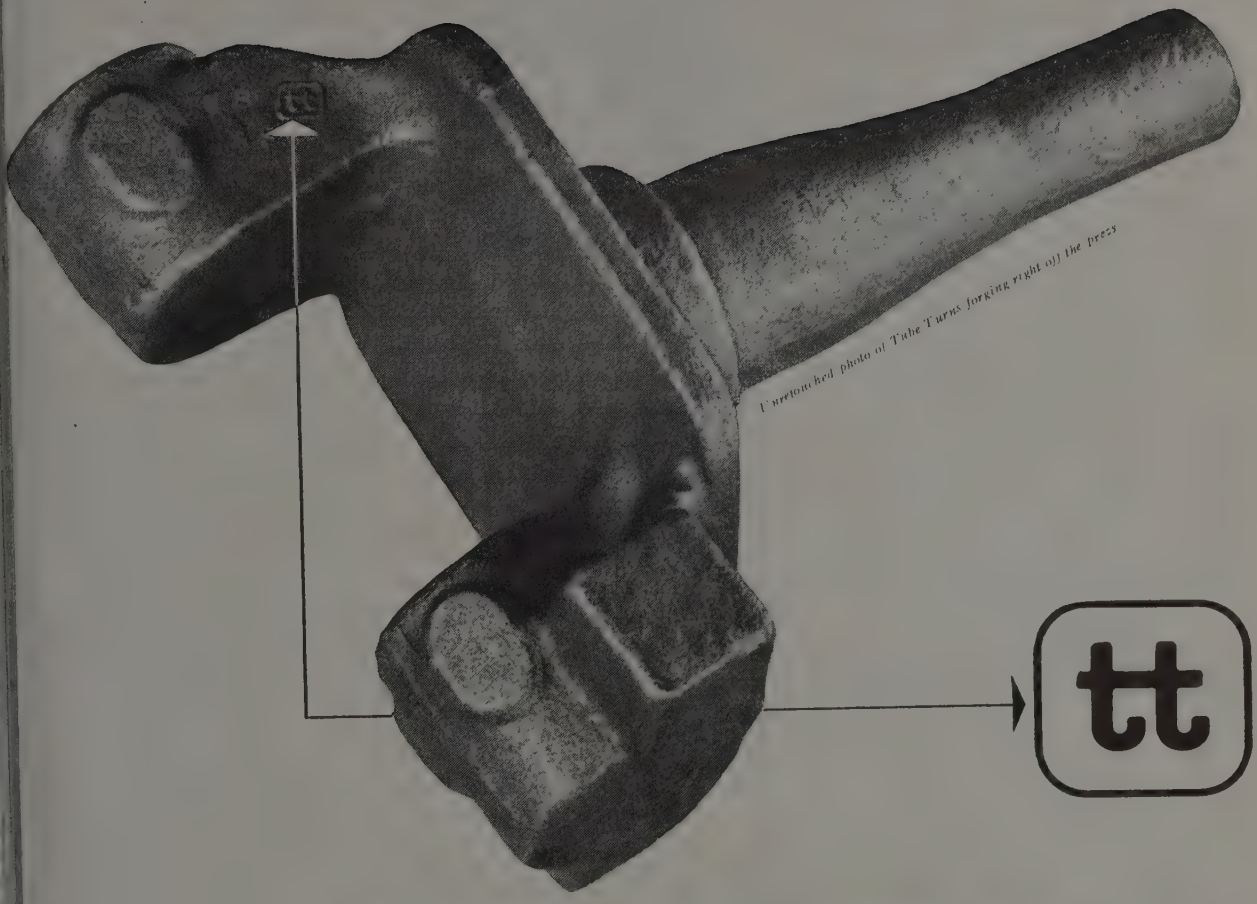
Steels to H-band compositions have been most widely accepted by the farm machinery and tractor manufacturers and producers of oil well drilling equipment. Users report satisfactory performance and considering that these manufacturers are applying H-steels on quantity production parts, processed in continuous heat treating equipment, tends to support the claims made for controlled hardenability.

Trends in Research: The real frontier, the place where the radical new steps will be taken, where really new materials will appear, is physics. It is improbable that the next really new step will be discovered by mere empirical experimentation, and likely to be the result of a theoretical concept confirmed by experiment. This opinion was brought out in the paper, "Trends in Metallurgical Research" by C. S. Smith, director, institute for the study of metals, University of Chicago, Chicago.

Physicists working with metals need to be reminded that they are not simple. He is annoyed by complexity and tends to simplify his models so that the equations do not become unmanageable. Metals themselves have no such inclination. The metallurgist rather revels in the delightful complexity and unpredictability of his materials, and can generally bring up some odd fact either in support of or in contradiction to the physicist's contention. It is the co-operative effort that will pay off. The physicist must learn to appreciate the great mass of experimental data collected by the metallurgist, and to talk in a manner that the metallurgist can understand, while the metallurgist must have sympathy for the physicist's simplifications, and help him to avoid the many pitfalls.

Spraying Coal: Since changing moisture content of coals entering the plant will cause a change in bulk density, it is obvious that a means of maintaining an even bulk density as charged into the ovens will be advantageous. This was brought out by P. C. Mayfield, superintendent coke plant, Alan Wood Steel Co., Swedeland, Pa., in his paper on "Carbonization of Coal Sprayed with Oil." This procedure will tend to even out the plant operation by maintaining more even flue temperatures, more evenly charged ovens and a more uniform coke. Moreover, it tends to bring out a higher and more even daily coke production, facilitates the flow of coal from the larry car and tends to prevent freezing in bins and allays dust condition.

Maximum density of coal is obtained at about 0.20-0.25 per cent of oil by weight to coal charged. Oil should not be used in indiscriminate amounts; close checks should be made on bulk density as it is possible to increase the weights sufficiently that difficulty might be en-



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countered in completely coking the oven charge or in pushing.

Blast Furnace Operation: First public disclosure of the technique of "pressure blowing" was made by J. H. Slater, assistant district manager, Cleveland district, Republic Steel Corp., Cleveland, in his paper on "Operation of the Iron Blast Furnace at High Pressure."

The new technique gives every indication of achieving:

1. GREATLY INCREASED OUTPUT OF IRON from existing furnaces to which it is applied.
2. USE OF LAKE SUPERIOR IRON ORES now considered unusable by reason of the expense of preparing them for "normally" operated blast furnaces.
3. LOWER COKE CONSUMPTION per ton of iron produced.
4. ULTIMATE REDUCTION IN COST OF IRON PRODUCTION, all other present costs remaining constant.

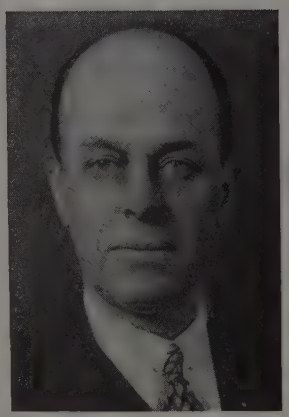
Mr. Slater revealed that two furnaces operated by Republic Steel Corp., the Cleveland No. 5 and the Youngstown No. 3, have been gigantic guinea pigs in experimental work commenced during the war as part of the government's effort to step up iron and steel production.

The importance of the technique to the lake iron and steel industry lies in the ability of a pressure blown furnace to use finely divided ore without production of excessive flue dust. With the exhaustion of high-grade Lake Superior open pit ores, probable in a decade, the technique of pressure blowing appears to be a great step toward the utilization of lower-grade ores now regarded as unusable. Much work is being done at the present in perfecting methods of "beneficiating" these ores by grinding them, roasting to make them magnetic and then concentrating them by magnetically separating them from rock and other impurities. A great problem heretofore has been how to economically agglomerate this finely divided ore into a form usable in furnaces operated under present practice.

Productivity of a blast furnace varies directly to the amount of air blown into it. It takes roughly 4 tons of air (100,000 cu ft) for each ton of iron produced by the blast furnace. The shorter the time necessary to blow that amount of wind into a furnace, the quicker the ore is reduced. This in itself would indicate that increased production was simply a matter of bigger and more powerful blowing devices, a conclusion which is spoiled by certain economic and physical factors. When the volume of wind is increased to too great an extent, it passes through the furnace with such velocity that large quantities of fine iron ore are blown out of the furnace with the escaping carbon gases. Excessive loss of flue dust makes operation of a furnace at high wind volumes economically impractical.

Rapid passage of air through the furnace prevents coke from contributing its full ability to reduce the iron ore, thus causing increased coke consumption per ton of iron produced.

J. H. SLATER



W. S. UNGER

In pressure blowing the advantages of large wind volumes without the previous mentioned disadvantages are achieved. This is accomplished by structural changes in the furnace to restrict the flow of escaping gases as desired. At the same time, powerful turbines blow large quantities of air under greater than normal pressures into the bottom of the furnace. Consequently the air and gases move upward through the furnace in greater volumes but at a much slower velocity.

Cleveland No. 5 furnace has been blown at a rate up to 110,000 cfm during the past six months. In normal blast furnace practice volumes of 75,000 cfm are rarely exceeded. Since last August this stack has been operated under pressure with a burden of no better than average ore and coke and with no scrap added. Under this lean diet the furnace has produced all-time corporation record tonnages.

Blast pressures up to 30.5 psi have been used as against a normal of 20 to 25. Slater forecast that with new turboblowers now being manufactured, volumes up to 125,000 cfm under as much as 50 psi pressure might be blown in blast furnaces.

Increase of 11 to 20 per cent in iron output thus far achieved will be small compared with that possible when new 125,000 cfm blowers now on order are received.

Changes required in blast furnace construction to permit a furnace to be operated under high pressure are comparatively minor. They may total from $70,000 to $150,000 depending on the furnace, providing sufficiently powerful blowing equipment is already available. Because of the tremendous cost of the huge complicated blast furnace, such a cost would probably not exceed 1 per cent of the capital investment.

Blast Furnace Hearths: Distance between the centerline of the iron notch and the top of the bottom refractories should be between 30 and 36 in. This detail was brought out in the paper "A Design for Blast Furnace Hearths", by by W. S. Unger, consulting engineer blast furnaces and coke ovens, Carnegie Illinois Steel Corp., Pittsburgh. The bosh should start about at the top of the tuyere cooler, about 10 in. above the centerline of the tuyeres.

The hearth jacket cools a large area of the hearth. It should be a minimum of 5 in. thick and its length should depend upon the hearth diameter. One plant is effectively using welded turns in place of bending the cooling pipes. To obtain a good bond between the iron and the imbedded steel pipe, pickling or sand blasting the pipe might be used.

For furnaces with hearth diameter 20 ft and under, the thickness of the hearth jacket plate should be 1 in. over 24 ft diameter, 1½ in. The tuyere jacket should be the same thickness as the hearth jacket plate and should extend from the top of the stave to the lower bosh line.

It has been found advantageous to install several equally spaced radial drain pipes from the bottom of the high heat duty firebrick to take away any moisture. A furnace so equipped dripped water for several weeks after blowing in.

There are two methods in use for determining the number of tuyeres required —first being the circumferential distance between the tuyeres, and the second being the square feet of the hearth area per tuyere. The second method is preferred and a furnace designed with 25 to 30 sq ft of hearth area per tuyere should produce optimum results.

If firebrick can be protected until the hotter portions of the hearth form a monolithic mass, iron penetration can be reduced. A monolithic pad of sillimanite has been placed on top of the firebrick with this in view. While it is difficult to evaluate the effect, it is believed this is good practice.

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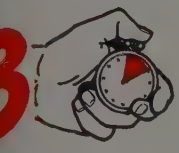
3 

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These are the five big reasons why Graph-Mo meets your new precision requirements better than other steels. But you'll want *all* the facts on how this Timken graphitic steel makes better gages—at lower cost. So we've prepared a 48-page booklet which tells the whole story of Graph-Mo and of the other famous Timken graphitic steels. A request on your firm's letterhead will bring it to you at once. Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

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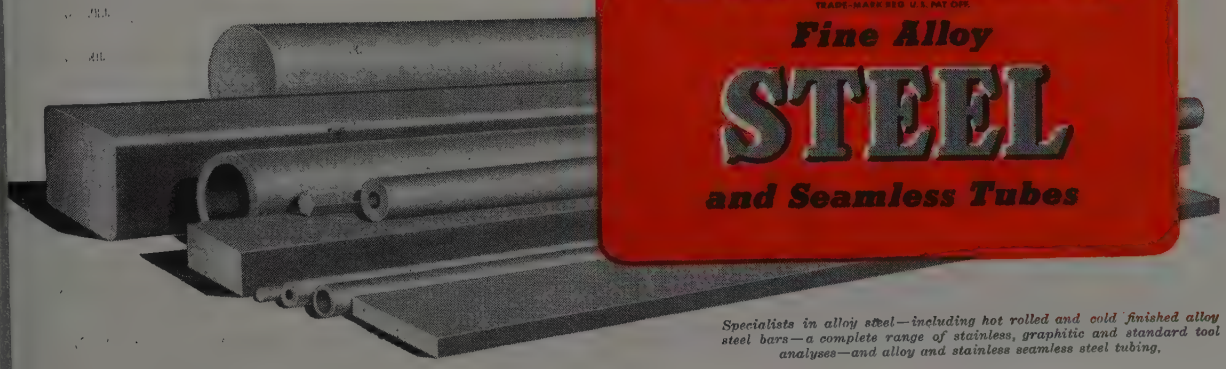

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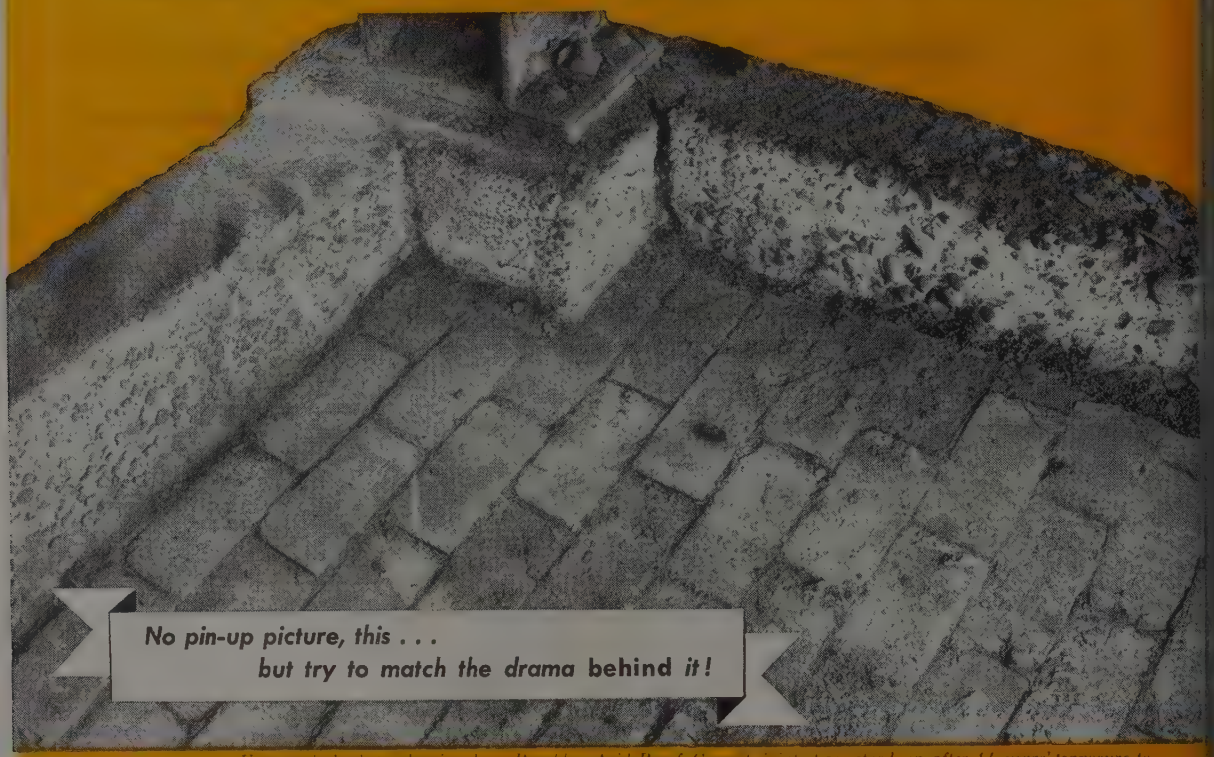

Untouched photo showing how Penchlor Acid-Proof Cement joints have stood up after 14 years' exposure to sulfuric acid spillage and fumes. Compare with badly corroded concrete sill which has been replaced many times.

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Chrome-Moly Electrodes

(*Continued from Page 90*)

manually, or in form of continuous heavily coated coils, spirally wound with asbestos, with a suitable head for automatic welding.

As many of the examples of physical properties indicate, there is a wide divergence of opinion on preheating and postheating practices. Table II reports tensile and elongation values determined in accordance with the AWS-ASTM.

Specification A233-45T sets a preheat and interpass temperature of 212° F and a stress-relieving temperature of 1150° F for 1 hour, both of which are lower than the temperatures specified for general fabrication work.

Table III lists the same type of data based on welds made with a preheat and interpass temperature of 500° F, and a postheat treatment of 2 hours at 1300° F.

Translating the data of Table III into graphical form, Fig. 2, both the effect of increasing chromium with a fixed molybdenum content and the influence of coating design may be observed. As the chromium goes up, both the yield point and the tensile strength become higher while elongation falls off to some extent. The XX13 coating consistently displays more strength than the XX10 coating and suffers slightly by comparison in elongation values. It can be seen, however, that all ductility values reported for this heat treatment are adequate.

In Table IV mechanical properties of 3/16-in. type 2110 electrodes are compared, using the heat treatment of Tables II and III to reveal the role of welding and heat treating temperatures. The results are not surprising but the flexibility of properties arising from controlled heat practices is gratifying.

The welding engineer and metallurgist can choose the chromium molybdenum steel with the best analysis for inhibiting graphitization and for optimum creep strength, while varying preheat, interpass and stress relieving practices to obtain a desirable balance of physical properties. Naturally, the same forces work in the opposite direction. If field practices are not properly supervised, undesirable mechanical properties, or even cracked welds may be encountered.

Electrodes XX15 of the chromium-molybdenum types may be used for flat position, or all position welding. Pipe and valve fabrication, as well as casting repair, have all been accomplished with this low hydrogen lime-ferritic type of coating. Table V presents the weld deposit physical properties of type 2115 (1.0 per cent chromium, 0.50 per cent molybdenum) weld deposits used in casting repair work.

Two per cent chromium, 1.0 per cent

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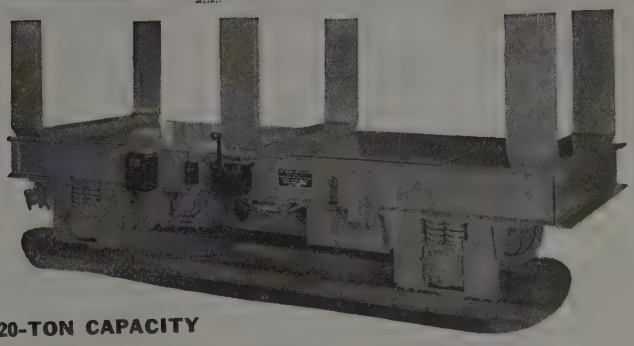

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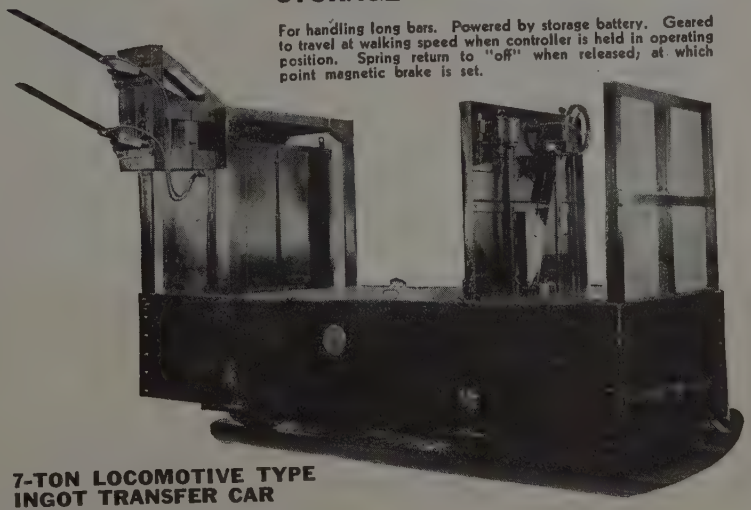

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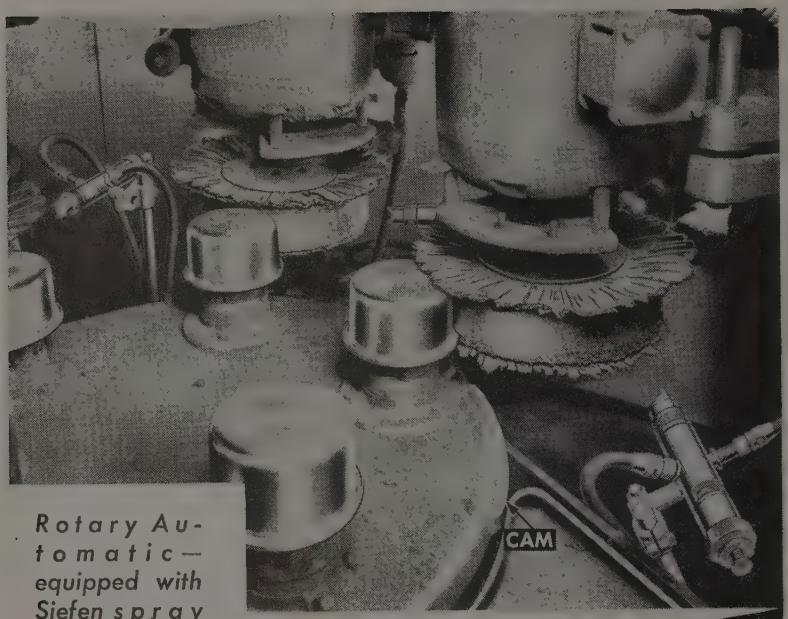

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molybdenum electrodes of the 4215 type have been used with the American Welding Society procedure to give the test data tabulated in Table VI, which lists 4210 and 4213 values for comparison.

Here again tensile values will be reduced and ductility figures will be improved where higher preheat and interpass temperatures are employed along with stress-relief temperatures just under the critical.

This same coating type has been extended in the series to 3.0 per cent chromium and 1.0 per cent molybdenum electrodes for every high temperature, high pressure power piping applications. Test results for a regular flat position test plate are listed in Table VII, while Table VIII gives data on procedure qualification tests under ASME rules both for the vertical fixed position and the horizontal fixed position.

Preheat and interpass temperatures of 500° F were specified for welds reported in Table VII, and the following heat treating cycle was used: Hold at 1425° F for 1 hour; cool to 1200° F at a rate of 50° F per hour, then air cool.

Temperature of 500° F Specified

Preheat and interpass temperatures of 500° F were specified for welds reported in Table VIII, and the following heat treating cycle was used: Hold at 1350° F for 2 hours minimum, or 2 hours per inch of thickness; cool to 1200° F at a rate of 50° F per hour; cool to 800° F at a rate of 100° F per hour, then air cool.

For pressure vessel welding of chromium-molybdenum steels, automatic procedures such as that shown in Fig. 3, are often employed. Valves, similar to the one in Fig. 4, are also fabricated by automatic welding procedures.

Continuous coils of type 1120 electrodes are used with individual welding procedures wherein both interpass and stress-relieving temperatures are adjusted to the type of work being welded. Table IX summarizes type 1120 deposit properties following the AWS testing procedure.

Both gas heating and induction heating are satisfactory for the heat treatment of chromium-molybdenum piping. An induction heating set-up is shown in Fig. 5.

Power plant operations are going to higher pressures, up to 2000 psi, and to 1000° F, with a resultant need for the creep strength of carbon molybdenum steels, in which graphitization has been inhibited by chromium additions.

This article has presented four basic electrode types in analyses ranging from 0.5, to 3.0 per cent chromium and 0.50 or 1.00 per cent molybdenum that are now available for the welding of power

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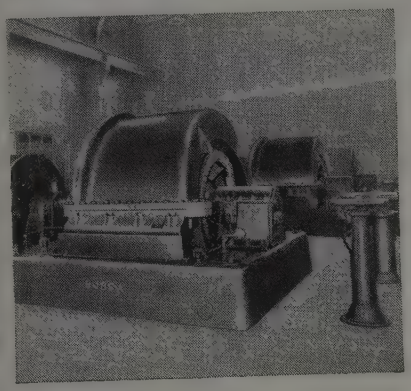
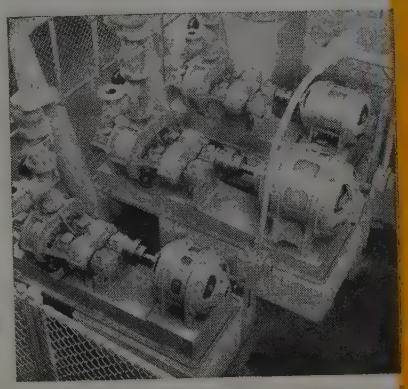




Safe, clean water usually depends upon the protection of supply sources through sewage purification. Many modern plants use Roots-Connersville Blowers to help remove impurities and thus allow the resultant purified water to be returned to lakes and streams for re-use by homes and industries.

The same R-C *dual-ability* which devises these essential blowers is responsible for the successful, dependable performance of man-made "wind-makers" in practically every industry and in a wide variety of applications. Our capacity to supply either Centrifugal or Rotary Positive types enables us to meet the exact needs of each installation, without prejudice.

Advanced engineering, plus almost a century of blower building experience, enhances the value of this completely independent thinking. The result is that R-C Blowers fit the job and can be relied upon for many years of economical, trouble-free operation.

ROOTS-CONNERSVILLE BLOWER CORP.
705 Steelton Ave., Connersville, Indiana

ROOTS-CONNERSVILLE
ROTARY CENTRIFUGAL
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

WE MOVE AIR OR GAS IN ANY QUANTITY FOR ANY INDUSTRY

Centrifugal Blower

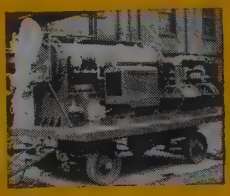
Used in oil refining, 11,750 CFM capacity. Similar R-C Blowers are widely used in foundries, blast furnaces and other industries requiring high capacity equipment for boosting or exhausting air or gas.

Rotary Positive Blower

Compactness of R-C Blowers suits them to many kinds of built-in applications. This portable aerator, with gas-engine drive, supplies air to fish in hatchery ponds, when the surface is entirely frozen over.

Positive Displacement Meter

Measures and records gas furnished by a public utility to an industrial consumer. R-C Meters with their "cash register" accuracy, measure or proportion any quantity of air or gas up to 1,000,000 CFH.



Inert Gas Generator

Provides protection, economically and efficiently, against fire and explosion hazards, where inflammable gases or liquids are processed or handled. Standard blower and gas pump are incorporated in unit.

R-C *dual-ability* will help you select the right air or gas handling equipment for your specific needs. Consult us without obligation.

MAIL THIS COUPON WITH YOUR LETTERHEAD

Roots-Connersville Blower Corporation,
705 Steelton Avenue
Connersville, Indiana
Please send information on:

BLOWERS_____ EXHAUSTERS_____
VACUUM PUMPS_____ METERS_____
BOOSTERS_____ LIQUID PUMPS_____
INERT GAS GENERATORS_____

NAME_____
TITLE_____

Improved Protection Against Overtravel with new Weight-Operated Limit Stop

No. 10-W Youngstown size; 40 H.P.; 230 volts; d.c. maximum rating.

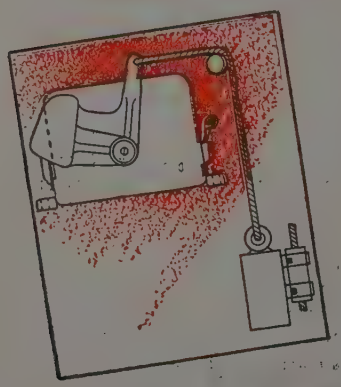
Now, a *weight-operated* Safety Limit Stop for the smaller horsepower crane-hoists. Tripped by *weighted* operating-lever when the danger zone is reached . . . reset *automatically* by suspended *weight* when controller is reversed to lower the hook-block. Other advantages are:

1 No lubrication required—Oilite bearings are self-lubricating and long-lived. This means that the costly and sometimes forgotten item of lubrication-maintenance is eliminated forever.

2 Compact—easy to mount—Small, over-all dimensions—four convenient mounting holes—one suspended weight.

3 Small reset travel—High crane lifts are possible with this new No. 10-W because the amount of travel between "run" and "tripped" positions has been kept at a minimum.

4 High interrupting capacity—Two normally open and two normally closed contacts, mechanically interlocked and with wide, vertical opening, always assure positive interruption of the hoist motor current.



Send for Bulletin 1032 which gives complete details for applying Youngstown Safety Limit Stops to both new and old cranes, either a.c. or d.c.

Optional Style—with offset weighted-arm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block. Available on all sizes of EC&M Youngstown Limit Stops.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

piping. Typical test values prove that good tensile and ductility figures are obtained. X-ray soundness is quite acceptable. In this connection, welding demonstrated its ability to keep pace with advancing metallurgical knowledge.

BIBLIOGRAPHY

1. "Electrodes for Welding Chromium-Molybdenum Steel" by D. L. Mathias and G. M. Leigh, Journal of the American Welding Society, May, 1946.
2. "The Welding of High Temperature, High Pressure Steel Valves" by Vincent T. Malcolm and Sidney Low, Journal of the American Welding Society, February, 1947.

Magnetic Particle Inspection

(*Concluded from Page* 91)

search committee, Welding Research Council, New York; "High Pressure Piping"—W. B. Bunn Jr., welding engineer, M. W. Kellogg Co., Jersey City, N. J.; and "Repair Welding"—William E. McKenzie, principal welding engineer, U. S. Naval Gun Factory, Washington.

R. O. Schiebel Jr., manager, Midwest District, Magnaflux Corp., Chicago, presented a paper on "Zyglo-Principles and Application to Nonmagnetic Weld Inspection." Following this, the conference came to a close with A. Robinson, Thomson Laboratory, General Electric Co., West Lynn, Mass., contributing a discussion on the Zyglo inspection of welds.

A considerable number of those attending the conference visited the Magnaflux Corp. plant on Saturday morning, May 10, to witness demonstrations of equipment and methods.

AWS Cleveland Section Holds Annual Conference

Three technical papers were presented to members of the Cleveland section of the American Welding Society at its annual conference on May 9. J. Franklin Maine of Republic Structural Iron Works, Cleveland, acted as chairman. Members heard O. C. Fredericks, General Electric Co., Philadelphia, discuss "Development and Application of Quality Control Techniques to Resistance Welding Production." His presentation was followed by a discussion given by P. J. Patton, Ransome Machine Corp., on "Development and Application of Welding Positioners and Turning Rolls." Carl M. Schaub, Arcos Corp., spoke on "Oxy Arc Process for Cutting Metals."

Evening program of the conference consisted of a dinner in Hotel Hollenden with A. E. Gibson, president, Wellman Engineering Co., as toastmaster and remarks by L. W. Delhi, national president of the AWS. The evening speaker was C. T. Burg, vice president in charge of sales, Iron Fireman Co.

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Steels
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MAGNAFLUX-AIRCRAFT QUALITY
None Finer
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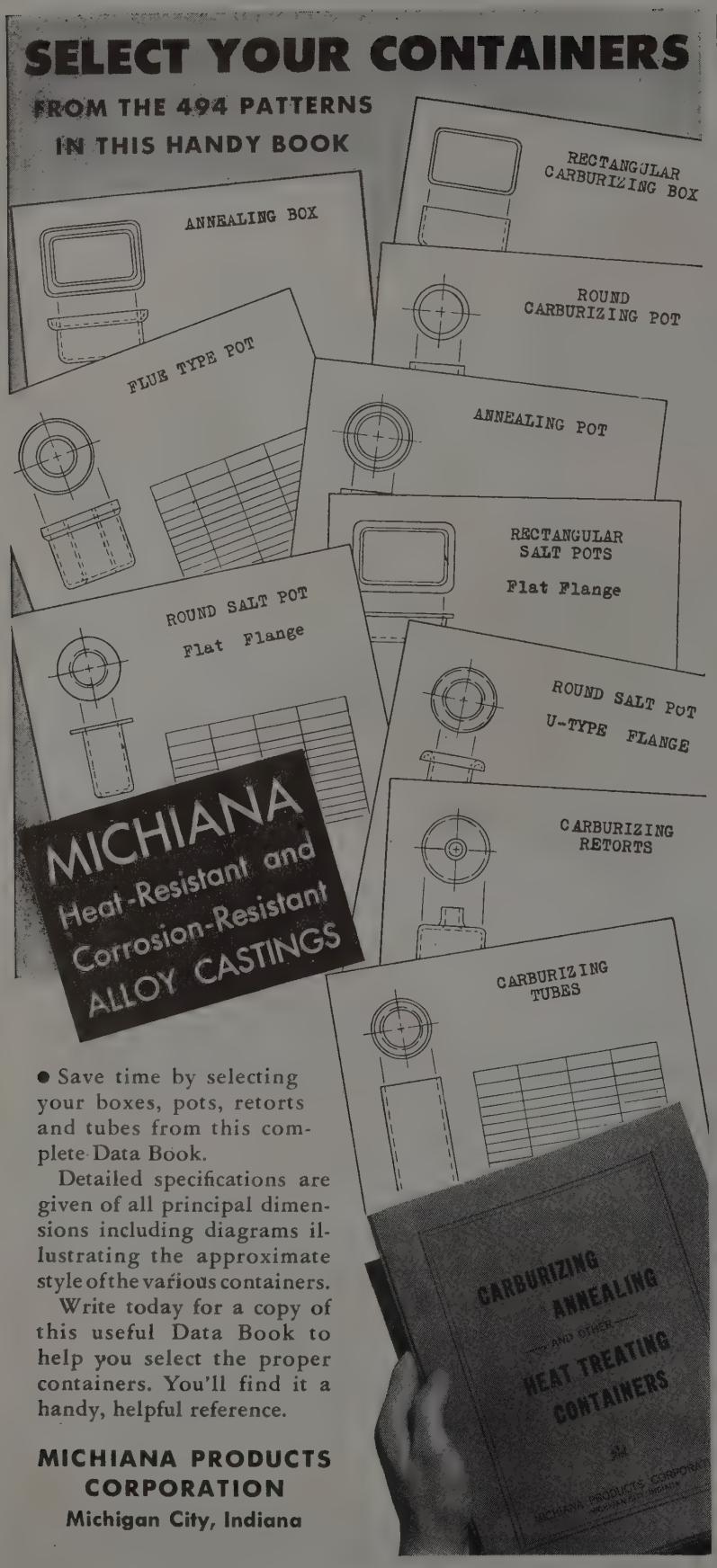
WARREN, OHIO



● Save time by selecting your boxes, pots, retorts and tubes from this complete Data Book.

Detailed specifications are given of all principal dimensions including diagrams illustrating the approximate style of the various containers.

Write today for a copy of this useful Data Book to help you select the proper containers. You'll find it a handy, helpful reference.

MICHIANA PRODUCTS CORPORATION
Michigan City, Indiana

Use of Files

(*Continued from Page* 98)

file is placed in the first gullet to right of the first tooth "set away" from filer. Filing then proceeds, until other half of flat tops have been cut away. This is repeated on every other gullet up to the handle.

A hand ripsaw is filed so that tooth points, not tooth edges, do the cutting. File is held level and at right angles to side of saw blade, every tooth being brought to a square edge. Saw then is removed, turned end for end, reclamped and its remaining teeth filed. Choice of files and procedure generally is same as for crosscut handsaws.

Larger crosscut saws commonly have two types of teeth called cutters and rakers. As these names imply, cutter teeth do the cutting and rakers clear the cut. This type of crosscut saw is best filed when clamp-held at an angle about 45 degrees away from the operator. This gives the operator easier access to the cutter teeth and allows him to get the correct angle on the teeth from a normal filing position.

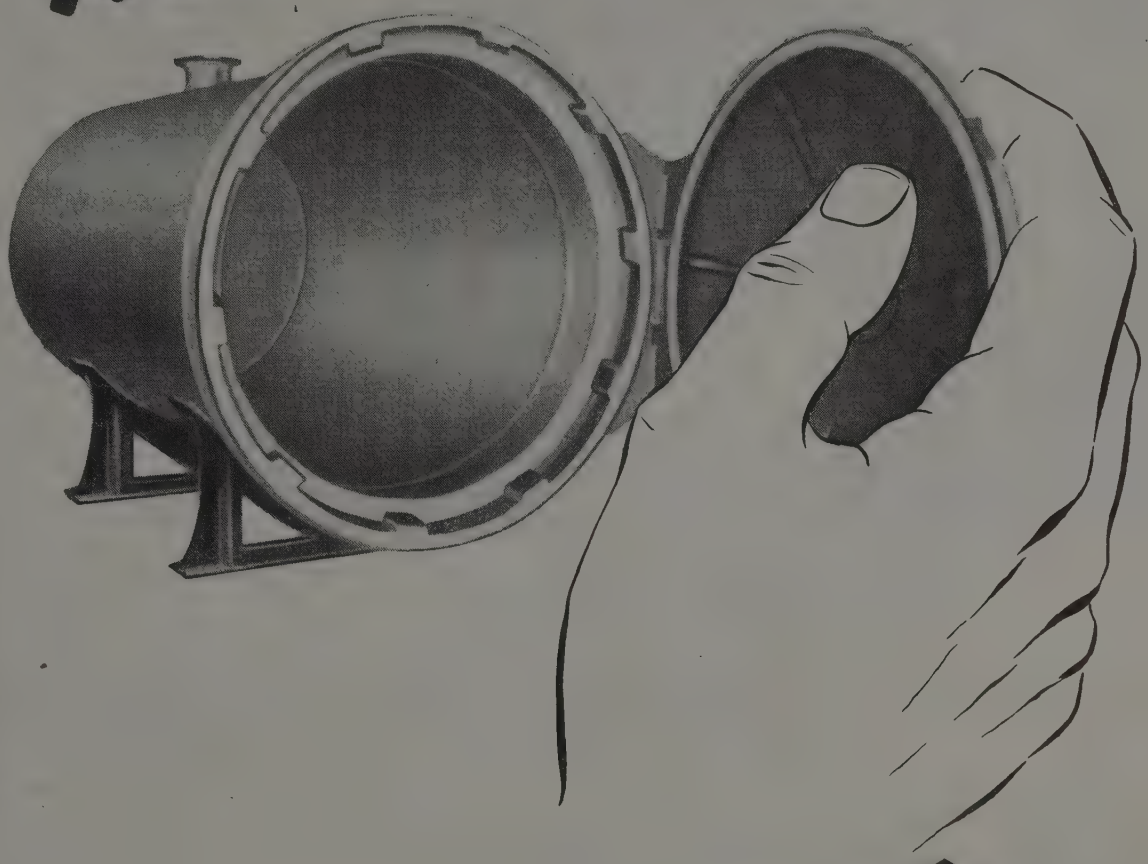
A large crosscut should be jointed so that tops of raker teeth lie slightly below tops of cutter teeth—but with all of each kind of teeth at uniform height. For normal work this uniform difference in height should be not less than 1/100 or more than 1/64-in. All cutter teeth are filed to a sharp point with a special crosscut saw or mill file.

For filing raker teeth, saw blade is readjusted to a vertical position, and the file stroked straight across on the rakers. A cantsaw file can be used to finish both edges of a raker tooth with one stroke. Should the gullets of teeth require deepening, a round or round-edge mill file is used, the latter serving to deepen gullets and to file teeth at same time.

Circular saws are jointed to bring all points down to exactly the same radial distance from the saw center, by holding a file on the saw table and slowly revolving the blade backwards by hand, until all teeth touch the file lightly and evenly. If the disk is sufficiently rigid to prevent chatter, a large-diameter circular saw can be filed in place. For this operation a 10-in. cantsaw file is most favored, although a mill bastard file frequently is employed. Small diameter circular saws usually are removed from their arbors and are clamp-held for filing purposes.

A slim taper file generally is satisfactory both for circular crosscut and for circular combination saws. Outline of original teeth should be followed in filing so that all teeth will be of the same

AUTOCLAVES



Absolute control of every process, from the first alloying to the finished product, makes possible the excellence, uniformity and quality of Worth Steel Plates and Heads for fired and unfired pressure vessels, locomotives, tanks, vats, chutes, flues, bulkheads, buoys, kilns, uptakes, hoods, gates, ramps, autoclaves, tank cars, machine bases, machine parts, gas holders, platforms, bubble towers, boilers, water heaters, caissons, pipe, etc. Write for information, today.

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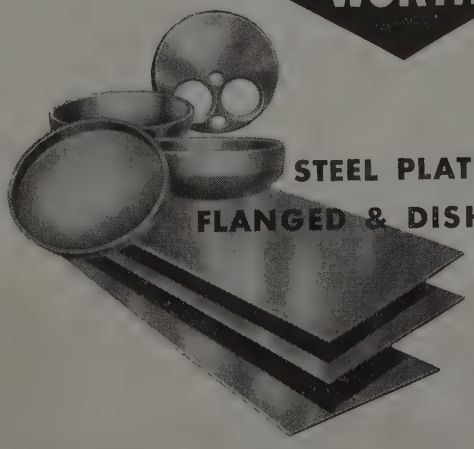

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GOODYEAR Butadiene Storage··

PROTECTION

Certain manufacturing processes created through wartime exigency present countless problems from the standpoint of safety during the peacetime years ahead.

One such process is the manufacture of synthetic rubber as is produced at the Goodyear operated Rubber Reserve Plant at Akron, Ohio. Farsighted company engineers realized the need of absolute security against fire damage for their butadiene storage and handling facilities, *and they got it.* "Automatic" FIRE-FOG was the answer, for these *test proved* systems were designed and developed particularly for the control of fires originating in highly flammable liquids and solids. The protection of each operation at this plant was of necessity engineered in a most exacting manner thus assuring the utmost in safety at a minimum of cost.

Isn't *now* the time to determine whether your fire hazard protection is adequate? An "Automatic" Sprinkler engineer will cheerfully furnish complete information about an "Automatic" FIRE-FOG installation—*where* it should be used, *why* it protects, *how* it operates. Write today.

FIRE PROTECTION
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shape and all gullets alike in width and in depth. Mill bastard files with one round edge are widely used in sharpening circular rip saws, the round edge permitting shaping of gullets and dressing of teeth with the same file.

Bucksaws usually are removed from frame and are clamp-held for sharpening. A slim taper file is a good tool to use on them, same as in filing a hand crosscut saw. Bucksaw teeth may, however, be filed without removing the blade from its frame, a 6-in. mill bastard or a 6-in. special crosscut file being used in such case. Grasp the saw blade firmly and keep the file nearly flat with side of the blade, cutting stroke of the file being from bottom to top of the saw teeth.

Fine, straight teeth are characteristic of butcher saws. These saws are sharpened with a sharp-edged, slim taper file, usually about 3½-in. in length. Butcher saws have such sharp gullets that they require a special-design of file.

In precision filing, innumerable shapes, sizes and cuts are involved. Industrial applications of precision filing today extend far beyond the long-established craftsmanship in clock, watch, jewelry and kindred industries. Supplementing original Swiss patterns and designs, the American file manufacturing industry of late years has taken the lead in design and production of filing tools for exacting work involving close limits and fine finish.

Elementary rules for general filing also hold for most precision work. Flat precision files should be used with a slow, smooth cutting stroke, the file being moved laterally along the work as this forward stroke is made. Round or half-round types should be turned clockwise during each stroke to insure a deeper cut and smoother finish.

Precision filing is intimately associated with "make-and-break" electrical apparatus, notably ignition systems of automobile and aircraft engines. This work requires special purpose files known as "tungsten," "contact" and "platinum" files. For dressing distributor ponts tipped with tungsten, iridium and similar metals, the platinum and tungsten-type files are widely used. Contact point files are employed on the "contacts" of spark coils, magnetos, electric bells, switches, and contactors, and also on the sparking points of engine spark plugs. When dressing distributor points, this type of file must be given a straight, nonrocking stroke in order to develop the broad, level surfaces which are necessary to proper functioning.

Improper care, improper use and improper selection are all evil influences

Best for the supply of it

Wolff Steel Service

Whatever your problem, whatever your need, Inland makes floor plates that are made to the measure of the job you have in mind. Specifically, this means a great range of sizes and weights of plate, plus variations in the four way safety projections to exactly fit your application.

In addition, Wolff Steel Service adds a new characteristic to these desirable properties . . . a friendly, human interest that runs all of the way from suggestions and ideas to cost estimates. You'll find, as thousands everywhere have, that Wolff Service offers a *real* service to you when you need bars, plates, sheets, structurals—and floor plates. Write or call.

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SPEED REDUCERS

Speed reduction is controlled transmission of power, and the degree of control is limited to the efficiency of the gears. The OTTUMWA-Sykes gear with its continuous herringbone teeth utilizes every fraction of face width. This represents the most efficient and economical method yet devised of transmitting power between shafts whose axes are parallel. OTTUMWA GEAR REDUCTION UNITS are furnished in single, double and triple reductions, with respective ratio capacities 2-1 to 10-1; 10-1 to 60-1; 50-1 to 200-1. Our engineering department will help you select the proper reducer.

E S T A B L I S H E D 1 8 6 7

OTTUMWA
IRON WORKS
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in shortening the useful life of files. Files must never be tossed into a drawer or a tool box with other tools. This damages the other tools as well as the files. Stand files separately. One way is to locate them by their tanges in a row of holes in a board. Another way is to hang them separately by their handles.

Take every precaution to protect the teeth from rust and from nicking. Filings or chips, which are bound to lodge between the teeth in use, should be cleared every few strokes by tapping the file on a bench or other wooden surface. Never "rap out" a file against a machine bed or other hard surface. That will damage both the file and the machine. File teeth should be brushed or "carded out" frequenetly during use—and always before the files are put away after use. There are several types of file cleaners — including wire "cards" and stiff bristle brushes. Oil or grease should be removed by rubbing carpenter's chalk into the teeth and then brushing it out after it has absorbed the oil or grease.

In closing, it is fitting to mention that the number of tools, implements and mechanical parts which are dressed, sharpened, sized and finished by filing, actually is on the increase. For generations saw and tool sharpening have of course been recognized as primary filing jobs. Today, with improved file efficiency and with so many varieties of files available, they stand ready to tackle many new jobs.

Because these tools can be taken to the work, instead of the work having to be taken to the tools, cutting blades and similar elements in modern industrial machinery can be sharpened or "machined in place" by filing, without detaching and without disturbing machine settings. That characteristic alone makes the file the "indispensable tool" in industry and on the farm in this day and age of mechanization.

Enameled Steel Aerial Marker Installed

A new type aerial marker or aircraft guide constructed of standardized sections of baked enamel on steel was installed recently to determine costs and methods of design, fabrication and installation. The marker, installed on a roof in the center of Wheaton, Ill., was designed and constructed by Porcelain Enamel Specialties Co., American Rolling Mill Co., Pemco Corp. and J. M. Seasholtz & Sons Inc.

Sponsored jointly by DuPage squadron of Civil Air Patrol, the air power club of DuPage county and the Wheaton Lions Club, it was dedicated in May.

BIRDSBORO HYDRAULIC

For metal working:
Stamping
Forming
Forming by Guerin process (rubber pad)
Drawing (single, double and triple action)
Coining
Bulging (expanding hydraulically)
Dishing
Crimping
Bending and straightening (of structural shapes, plates, weldments, steel castings, etc.)
Flanging
Joggling
Piercing
Shell forging and drawing
Pipe bending
Riveting
Scrap crushing
Lead extrusion (cable covering)

For plastics industries: (self-contained and accumulator operated types)
Hand molding
Semi automatic compression
Fully automatic compression
Transfer molding (semi or fully automatic)
Angle type compression or transfer molding presses
Laminating (steam platen type, also with elevating tables)
Arbor presses (screw type)
Laminated tube wrapping machines

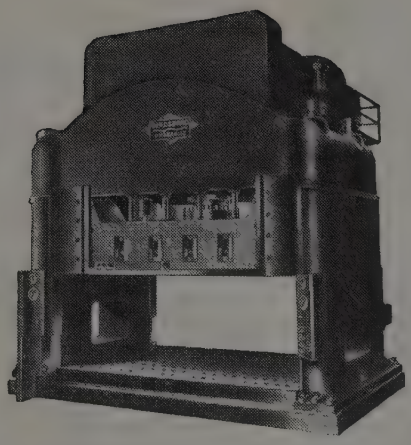
For rubber industries:
Steam platen presses
Belt presses
Duplex presses (for small mold work and repair work)

For general purpose applications:
Open post type, side housing and "C" frame types
Forcing (horizontal and vertical)
Shearing-in dies

For processing industries:
Filtering and straining
Asbestos cement (Presses and cutters for shingles and boards)
Insulating board
Linoleum
Leather
Embossing
Pipe testing

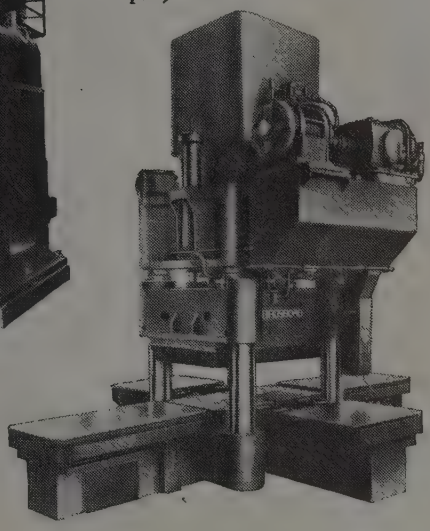
For railroad shops:
Car wheel forcing presses
Driving wheel forcing presses
Rail bending
Splice bar reclaiming
Bushing presses
Spring banding
Spring stripping

Accessories:
Accumulators
Accumulator safety valves
Accumulator controls
Hydraulic operating valves
Hydraulic globe (stop) and check valves
Hydraulic shock alleviators

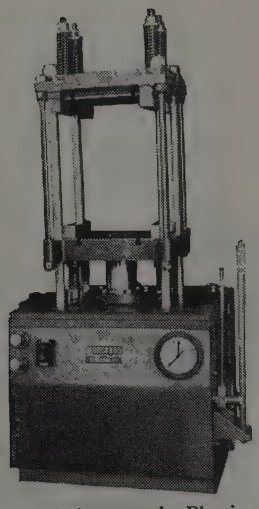


Deep Draw Press with hydro pneumatic cushion.

Four Station Shuttle Table Press for metal forming (with rubber pad).



LOOK OVER THIS LIST FOR THE HYDRAULIC PRESS YOU NEED!



Semi Automatic Plastics Compression Molding Press.

If you have a problem involving operations on processing requiring pressure, the chances are that BIRDSBORO can supply the hydraulic press to meet your specific need.

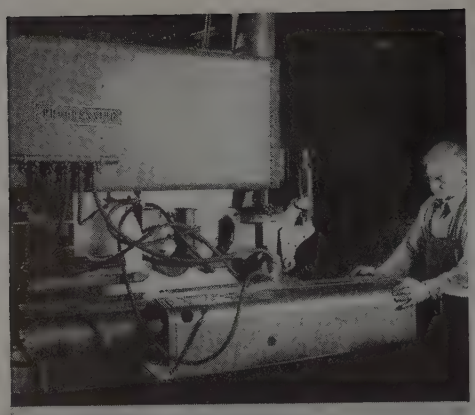
Birdsboro engineers have applied their wide experience in developing these types of equipment to produce an extensive and versatile line of presses. They are designed and constructed to give long, highly productive, trouble-free, economical service. Their exceptional rigidity and fine controls contribute to their durability and accurate, smooth operation.

For help in solving your press problems, take full advantage of our design-engineering facilities today.

BUILDERS OF: Hydraulic Presses - Steel Mill Equipment - Rolls - Special Machinery - Crushing Machinery

Birdsboro Steel Foundry & Machine Co. • Birdsboro, Pa.

BIRDSBORO HYDRAULIC PRESSES



Welding 44½" pressure tight seam

Spot-welding baffles inside tank

Ends are assembled with 102" of pressure tight seams

White Saves 30% — Improves Gas Tanks ...by Resistance Welding

When the White Motor Company switched to resistance welding in the fabrication of gasoline tanks for its motor trucks, White found that the tanks were not only stronger and more leak-proof, but also cost 30% less as they came to the assembly line.

Only 4 Progressive machines were required by White to take care of its production requirement of 100 complete tanks per shift. With the savings made, these machines—two spot welders and two seam welders—should pay for themselves in less than six months.

That's the kind of job resistance welding is doing all over. Sometimes the savings are a little less—sometimes even greater, depending on the nature of the job.

But—you cannot afford today not to investigate how much money you can save in production by switching to resistance welding. Progressive's Process Engineering Department will be glad to work with you in figuring the type of process, any minor changes in design, type of equipment needed, and potential savings.

In the meantime, are you receiving the "Welding Pictorial" published monthly by Progressive to acquaint industry with the latest methods and machines?

These 4 machines improved the quality of White gasoline tanks yet cut cost 30%.

IT PAYS TO WELD

PROGRESSIVE Welder Co. 3050 E. OUTER DRIVE • DETROIT 12

RESISTANCE WELDING EQUIPMENT

CABLE ADDRESS "PROGWELD"

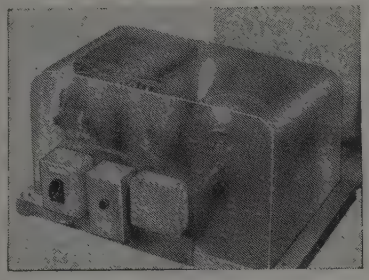
MEMBER RESISTANCE WELDER MANUFACTURERS ASSOCIATION RWMA

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Phase Converter

Capable of changing 110 v single phase current to 220 v three phase current, the phase converter manufactured by Reid Bros. Co. Inc., Beverly, Mass., can drive any machine or machines up to 1 1/2-hp capacity. Measuring 12 x 15 x 22-in., it is encased in a sheet steel cover, except for switches, and has



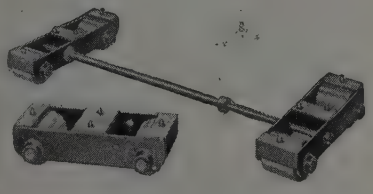
only one moving part that requires occasional lubrication. Its use eliminates the necessity of running in a higher voltage line as it provides standard current where only 110 v current is available.

2. Gear Chuck

New gear chuck that insures concentricity of both gears regardless of loose fit on a Fellows gear shaper arbor, is announced by Garrison Machine Works Inc., Dayton, O. It is easily and quickly arranged to permit cutting some tooth or space of top gear in definite relation to some point on previously cut bottom gear.

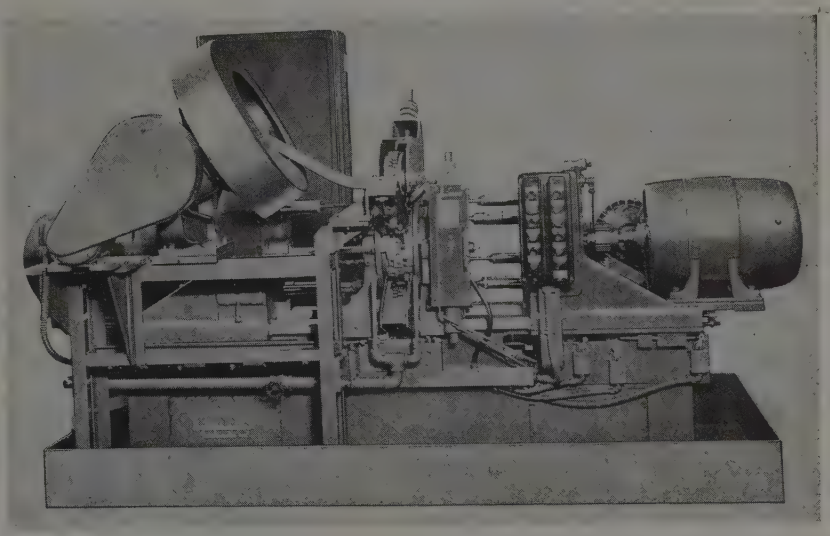
3. Skid Dollies

Heavy freight, machinery, dies, etc. may be carried with the 5-ton model Skid-Rol dollies with adjustable extension bar, introduced by Techtmann Industries, 714 West Wisconsin avenue, Milwaukee 1. By carrying the load a



few inches from the floor, they reduce possibility of accidents to a minimum.

Size of each dolly is 15¼ x 6⅛ x 4 in. with 3⅝-in. diameter rollers. Roller bearings are lubricated with Zerk fittings. Frame is of arc welded structural steel. The extension bar is of ⅝-in. cold rolled steel and telescopes inside an iron pipe. Minimum span of a pair of dollies with extension bar is 36 in. overall. Maximum span is 56 in. Slipping is prevented by steel cleats located on top of all dollies.



4. Drilling Machine

An automatic horizontal drilling and reaming machine for handling wrist pins is manufactured by Davis & Thompson Co., Milwaukee 14. Designated as type HI-12, its design is flexible enough that it may be adapted to similar work varying in size and shape.

On the machine, two opposed drilling heads are mounted on a common bed, power being supplied by two 7½-hp motors. Movement of heads horizontally is accomplished through a single hydraulic cylinder and by means of a rack and pinion drive. The hydraulic indexing fixture has six stations. Work pieces are fed from a hopper automatically and held by direct chain clamping. Cycle of machine is automatic.

5. Hydraulic Pallet Truck

Wear and tear on floor surfaces is reduced due to the plastic wheels incorporated into the multiple stroke hydraulic pallet truck built by Lewis-Sheppard Products Inc., 328 Walnut street, Watertown 72, Mass. Truck is equipped with Spring-Lift booster rollers which eliminate the need for chamfering of boards and which reduce wear on pallets.

Trucks are compact and easy to handle. They are light in weight but strength is provided by arc welded design and box section frame. Forward lowering makes load spotting quick and accurate. Hydraulic lift is operated through a selective length stroke double

foot pedal permitting operation from either side of the truck. Truck is built in capacities ranging from 1000 to 6000 lb.

6. Rubber-Tired Earthmover

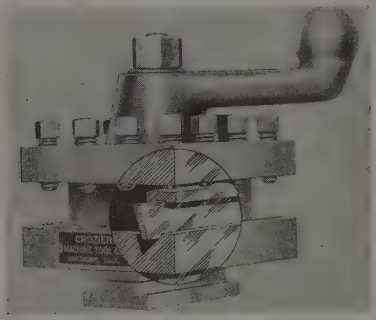
Powered by a 160 hp diesel engine and with four forward and four reverse speeds up to 12 mph, a new rubber-tired Tournadozer is announced by R. G LeTourneau Inc., Peoria, Ill. It has a constant mesh transmission which enables the operator to select any gear ratio or change from forward into reverse with no shifting of gears and no loss of momentum.

Steering is by use of air actuated disk clutches and brakes controlling the two wheels on each side. Bowl is cable con-

trolled and air actuated. Mounting is on four 14 x 32 in. taper bead tires, with greater weight being put on the tires for better traction as power requirements increase because of digging of push loading. Unit has a blade 11 ft 3 in. wide and 44 in. high.

7. Tool Post Turret

Holding four tools simultaneously and thereby reducing setup and down time, the tool post turret, manufactured by Crozier Machine Tool Co., 684 North

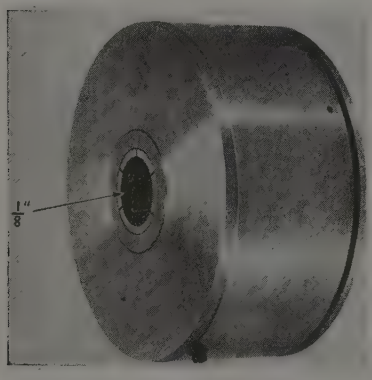


Prairie avenue, Hawthorne, Calif., is bolted in place on the lathe. Indexing is accomplished by opening the handle and revolving the turret manually.

Prelocation is determined automatically by a detent mechanism on the turret. Close indexing is maintained by hardened pins closely fitted into holes in the hardened body. Turret is available in three sizes.

8. Hydraulic Chuck

Problem of holding an extremely shallow piece measuring as thin as ⅛-in. by 2⅛-in. wide may be solved by a hydraulic chuck and step collets, products



of Erickson Tools, 2309 Hamilton avenue, Cleveland 14. Chucks may be adapted to either air or hydraulic operation. Collets grip uniformly along their entire length, permitting stubbing and use of broken drills. They collapse over a range of 1/32-in., making possible greater feeds and speeds and lower setup time. An accuracy of 0.0005-in. is possible.

9. Hydraulic Press

Of all steel welded construction and occupying only 18 x 36 in. of floor space, the 20 ton gap frame hydraulic press announced by Northern Tool & Machine Co., 1120 North 31st avenue, Melrose Park, Ill., has an 8 in. throat, 12 in. stroke and a platen 12 x 17 in. A stroke selector enables the operator

to adjust the stroke length with the tightening of a thumb screw.

Hard chromium finished ram, tonnage control adjustable up to 20 tons, pressure holding valve and fast ram speed are features. Press is motor driven and is offered with either foot or hand control. It is adaptable to metal forming operations, drawing, bending, straightening, forcing, riveting, crimping, piercing, staking and assembly.

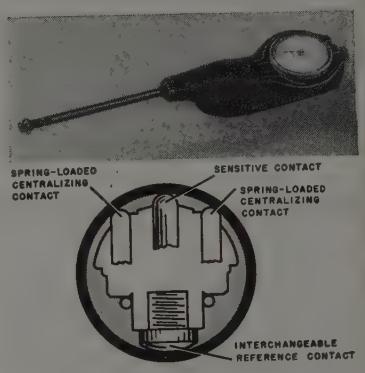
10. Brushless Paint

Factory-like finish for any metal or wood surface may be applied with an ordinary lint-free cloth, using Sleek, a brushless paint developed by Miller Corp., Garland building, Chicago. It may be applied with great speed. Appearance is that of baked enamel after its 1 hour drying period.

11. Self-Centralizing Gage

Thorough inspection of inside diameters between 0.250 and 0.500-in. is possible with the self-centralizing indicator gage model 1204 made by Federal Products Corp., 1144 Eddy street, Providence, R. I., to show size variations in tenths of thousandths. The gage employs 13 interchangeable extensions to cover the full range from ¼ to ½-in.

Holes may be measured to a depth of 2¼-in. Being a point-to-point contact gage, it reveals any small area imperfections in the hole. All contacts are chromium plated and radiused for accurate, long-lasting surface. Gage is supplied with wooden case, extensions required



and adjusting wrenches. It may be adjusted for a particular dimension with a master ring.

12. Broaches and Adapters

Standardized keyway broaches and adaptors in any size from 1/8 to 1/2-in. are available from Zagar Tool Inc., 23880 Lakeland boulevard, Cleveland 17. Broaches are automatically positioned to cut to proper depth by hardened and precision ground horn-type adaptors, fitting close into the pocket of the face plate. Horn type adaptors in sizes from 1/2 to 1 1/4-in. also are available from stock.

13. Grinding Wheel

Developed by Carborundum Co., Niagara Falls, N. Y., a new series 20 ceramic or vitrified bonded grinding wheel, is especially suitable for various tool

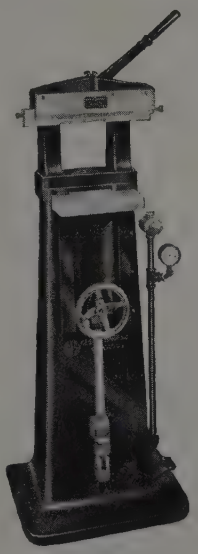
room operations such as surface, tool and cutter grinding and surface and cylindrical grinding of forms.

Also suitable for certain production operations, the wheel has the following

advantages: Faster stock removal, fewer damaged tools, longer tool life between grinds, less heat generation, better tool finishes and smaller inventories. As a result of extensive testing, a narrow pattern of grits and grades has been developed to handle a wide range of operations.

14. Marking Machine

Light, general-purpose pneumatic and hand-marking machine for use on flat, round or irregular metal surfaces is offered by Geo. T. Schmidt Inc., 4110 Ravenswood avenue, Chicago 13. Table



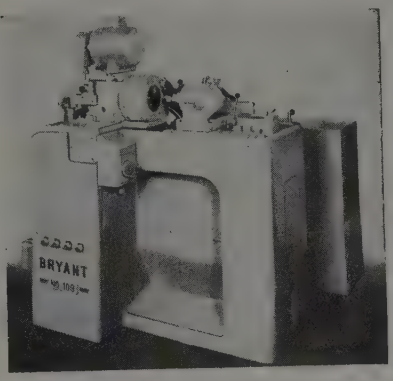
of machine is raised to marking tool by an air cylinder connected to the shop air line. A 4-way, foot-operated valve carries table down and up under pressure.

Depth of impression is controlled by hand valve with direct reading gage. With no accuracy in table position required, fast setups and short runs on parts of various sizes and shapes may be made economically. Flat and irregular surfaces are marked with knurls, while rounds are marked with flat dies.

15. Internal Grinder

High production grinding of bore diameters from ¼ to 3 in., up to 4 in. deep is possible with No. 109 automatic internal grinder announced by Bryant Chucking Grinder Co., Springfield, Vt. Machine will swing work up to 9 in. and is suitable for such jobs as ball bearing races, gears, rolls, bushings and other small parts. An important feature of the new machine is the easily operated hydraulic and electronic control arrangement that provides completely selective, infinitely variable cycles.

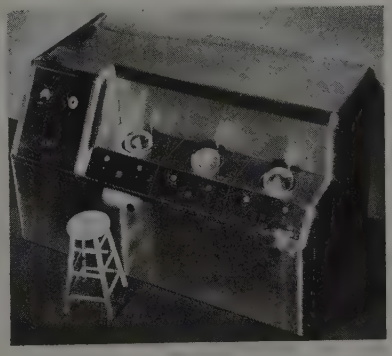
Only operator attention required is loading and unloading the machine and tripping the valve to start the cycle. Rough grind, true wheel, finish grind and return to chucking position as finish size is reached is all automatic. Machine



uses the new direct mounted high frequency wheelhead unit which makes possible wheel speeds up to 100,000 rpm. Provision also is made for a balanced, belt-driven wheel head, giving speeds from 200 to 2400 rpm.

16. High Vacuum Furnace

Capable of continuous operation at temperatures in the 1800° C region, a new type of high vacuum furnace for the heat treatment of materials which are highly reactive toward gases is announced by Eitel-McCullough Inc., 1570 San Mateo avenue, San Bruno, Calif. The stand-



ard type consists of three chambers integrated into a single enclosed cubicle as illustrated.

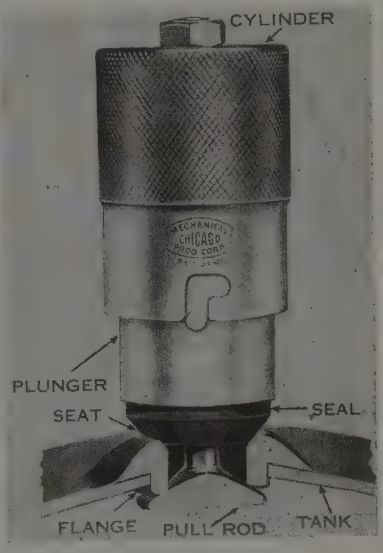
Cycling circuits are incorporated so that one chamber may be in the treatment phase while one is under preliminary pumping and the third is being reloaded. Each chamber is equipped with a high speed oil diffusion pump capable of maintaining high vacuum during the most difficult outgassing operations. Interlocking safety devices protect furnace parts against temperature extremes and heating filaments against burnout.

Furnace attains a production vacuum as high as 5×10^{-6} mm of mercury. Heating is accomplished by large diameter tungsten elements. Consuming a total of 15 kw of power, the three chamber unit has a total treating capacity of 175 cu in.

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 142.

17. Low Pressure Test Plugs

Quick-acting means for sealing openings in tanks, boilers and other receptacles which are to be tested by internal



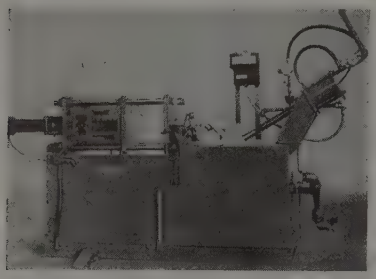
pressure is provided by Hydro-Matic self sealing low pressure test plugs manufactured by Mechanical Products Corp., 168 North Ogden avenue, Chicago 7. Intended for hydrostatic or air testing up to 100 psi, these plugs are self centering and are adaptable to any type of spudded, flanged or drawn openings, either plain or threaded. Plugs are offered for all standard pipe openings from 1/8 to 4 in. sizes.

18. Die Casting Machine

Completely self contained, a new hot-shot die casting machine distributed by Ermac Co., 1426 South Santa Fe avenue, Los Angeles 21, is a medium size machine, measuring 22 x 72 in. with a 40 in. height. Designed and built by Robert A. Cox Co., the air operated unit was developed for installations requiring intermittent production die casting work, but without the facilities or need for establishment of large die casting division.

Die casting unit features single hook-

ups for air, gas and 110 v current. It is furnished with blow torches for properly heating goose-neck and nozzle. Equipment includes pyrometer, thermocouples, holding furnace and venturi type gas burner. Holding pot has a capacity of



300 lb of zinc alloy. Casting capacity is 1½-lb, and maximum number of shots per hour is 720. Die capacity is 11 x 16 in.

19. Furnace Observation Port

An air-cooled observation port which can easily be installed in any new or old furnace wall, common brick, fire brick or steel cased, was introduced recently by A. P. Green Fire Brick Co., Mexico, Mo. Wide angle vision permits observation of furnace and grate conditions with no disturbance of firing cycle. Port has self-closing, air-cooled, ribbed shutter and divided blue pyrex window.

20. Aluminum Flux

An aluminum flux for brazing sheet aluminum—one that has a melting point of around 950°F and which becomes quite active at 1000°F, is announced by All-State Welding Alloys Co. Inc., 96 West Post road, White Plains, N. Y. It breaks down into a completely liquid state and gives excellent capillary action, leaving little trace of residue on the work.

21. Tapered Spiral Cutters

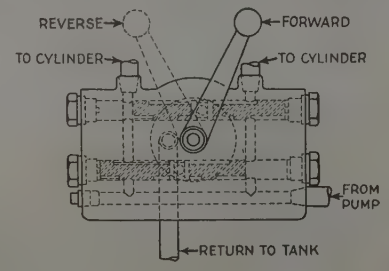
Complete line of tapered spiral cutters is announced by Cadillac Cutter Co., 1613 Eastern avenue, S. E., Grand Rapids 7, Mich. Cutters range in size from 1/2 to 7 degree taper per side, having 1/2 to 3 1/2-in. flutes and small end diameters of 3/32 to 1/2-in. They are suitable for machining all types of molds, dies, patterns, etc. where draft or clearance is required. Various designs are included in the line.

22. Plastic Heating Unit

Quick, controlled heat to 550°F plus or minus 5° under low operating pressure is delivered by the Vacu-Therm generator for heating plastics, developed by Castaloy Corp., 197 South Watherman, Detroit 17. Heavily insulated, self-contained unit has no moving parts, its heat transfer medium being Dowtherm E sealed in a welded vacuum chamber. It is manufactured in 16, 22 and 33 kw capacity. Generator is connected directly with the job through flexible tubes or pipes.

23. Hydraulic Valve

Suitable for controlling all types of reciprocating hydraulic cylinders, a new 4-port hydraulic cylinder valve, developed by R. I. Task Enterprises Inc., and offered by Morse Boulger Destructor Co., 205 East 42nd street, New York 17, obtains full reversal actuation from the cylinder itself. The valve accom-



plishes cylinder reversal with as little as ½-in. travel.

Features include: Mechanical shut-off by knob which springs into stop position; reverse lever which may be moved to any position without causing cylinder movement or creep; internal mechanism operating under pressure balances; and resumption of motion by pulling out stop knob and turning 90 degrees to detent position. Operating pressure is from 50 to 300 psi and pipe sizes are ⅛ to 1 in. Speed may be up to 500 cycles per minute.

24. Cotton Belt Splice

Quick, simple method of splicing woven cotton belting at the work place is announced by Unisplice Belting Co., 1152 Wolfendale street, Pittsburgh 12. The method produces uniform joints forming a smooth continuous belt. When using the method on jack shaft type drives, it is not necessary to dismantle the drive to replace an endless belt, even where the pulley is located between the bearing.

25. Knife Bar

With 22 per cent more work area and uniform distribution of magnetism over its entire surface, an electromagnetic knife bar developed by Hanchett Mfg. Co., Big Rapids, Mich., will hold knives to its extreme edge. Top plate is made by laminating alternate vertical strips of nonmagnetic and carbon steel. Knife bar assembly is mounted on journal brackets, permitting 360-degree swiveling.

26. Fire Extinguishing Nozzle

A fog nozzle, complete with 50 ft or 3/4-in. high pressure hose racked in figure 8 position, when connecting directly to a water main, produces a curtain of protecting fog in front of the operator shielding him from intense heat. Made by Bowser Inc., Fort Wayne, Ind., nozzle provides a 20 ft fog projection at 50 lb nozzle pressure with a gallonage discharge of 15.9 per minute.

27. Alloy Sprayer

Almost any kind of low temperature metal may be applied with the Forrester alloy sprayer introduced by K. & F. Metal Spray Industries, 11204 Charlevoix avenue, Detroit 14. Requiring 3½-cu ft of air per minute at 30 to 40 psi, and with a temperature control adjustable from 100 to 600° F, the entire unit is sealed within a brass shell, free from dust, dirt and tampering.

Setting up operation requires plugging

into air pressure line and dropping alloy to be used into the melting pot and locking down the cover. Metals melt in 2 to 10 min, and spraying is accomplished by pressing a button on the handle. Coatings as thin as 0.00001-in. may be sprayed. Metal may be deposited to a thickness of ¼-in. over a 4 x 6 in. area in less than 60 sec.

Units may be used in producing plastic molds, jigs, tinning on carbon brushes, selenium rectifier plates, etc. Sprayers are offered in three sizes with pot capacities of 6, 12 and 24 cu in. Models are manufactured in horizontal and vertical types.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

42. Circuit Breakers

General Electric Co.—12-page illustrated bulletin No. GEA-4407A is descriptive of model FK-439 breakers for 115 to 230-kilovolt service, three and five-cycle interruption and twenty-cycle closing. Dimensions, design features and application data are included.

43. Seamless Tubing

Steel & Tube Div., Timken Roller Bearing Co.—8-page illustrated catalog "Stock List of Timken 52100 Tubing" lists sizes, finish, weight, price, etc. of 101 sizes of this electric furnace seamless steel tubing. Also included are machining recommendations and heat treating data.

44. Lift Trucks

Hyster Co.—16-page illustrated bulletin No. F1055B gives full information on the Hyster 20 lift truck which transports, lifts, stacks and tiers loads weighing up to 2000 pounds. Powered by gasoline engine, this pneumatic-tired industrial truck features trunnion steering, hydraulic brakes, air cooled motor, adjustable load arms and ample overload safety factor.

45. Hollow Spindle Lathe

R. K. LeBlond Machine Tool Co.—4-page illustrated bulletin No. HS-120 describes and gives dimensions of 27 and 30-inch hollow spindle lathes which have 12½-inch hole through spindle.

46. Alloy Castings

Michiana Products Corp.—16-page illustrated bulletin No. 110 is entitled "Solving Your Casting Problems with Michiana Heat Resistant and Corrosion Resistant Alloy Castings." Compositions, properties and applications of these alloys are discussed. Details are given on centrifugal castings.

47. Gas Vaporizer

John E. Mitchell Co.—4-page illustrated bulletin "The Mitchell Domestic Vaporizer" discusses advantages obtainable by using this equipment with above or below ground storage tanks to vaporize liquid petroleum gas for heating applications.

48. Materials Handling

Lamson Corp.—4-page illustrated bulletin "Lamson Products" presents brief descriptions of roller gravity, live roller, booster, utility, slat, belt, overhead and vertical conveyors; pneumatic despatch tubes for industrial use; blower and vacuum equipment; and Trayveyor tray elevating equipment.

49. Dust Collector

Newcomb-Detroit Co.—8-page illustrated bulletin "The Uni-Wash Shake-Out Book" describes this equipment which includes intake hood, air cleansing unit and exhaust fan. It is available in five sizes for use individually or in combination to collect dust resulting from shake-out, core knockout, shaker screening, sand transfer, mold conveyor and pouring operations.

50. Paint Spray Hose

B. F. Goodrich Co.—2-page illustrated catalog section No. 4280 describes line of paint spray hose and explains advantages of its construction in handling oil, paint, lacquer, varnish thinner and synthetic enamel.

51. Steam Jets

Duriron Co.—8-page illustrated bulletin No. 1804 describes line of Durco corrosion resistant alloy steam jets for heating, agitating, circulation and digestion applications in many types of industries. Methods of computing steam jet requirements, available orifice sizes, standard designs and alloys are covered.

52. Finishing Tools

Severance Tool Industries, Inc.—28-page illustrated catalog No. 16 contains information on five Severance tool types. Midget Mill, deburring group, tube cutter group, countersink group, and miscellaneous types are described. Tables of recommended cutting speeds are included.

53. Stainless Steel Tubing

Babcock & Wilcox Tube Co.—Bulletin No. TB-323 outlines some uses of B & W stainless steel tubing and briefly describes important properties from application viewpoint. Data cover Croloy analyses as well as tubing and pipe size ranges.

54. Welded Pipe Fittings

Bonney Forge & Tool Works—20-page illustrated engineering reference data bulletin No. WT.46 presents details of complete line of WeldOlet pipe fittings which are made with welding, threaded and socket outlets. Construction details, application procedures, temperature-pressure ratings, stock sizes and details of special fittings are included.

55. Plastic Protective Coating

Wailes Dove-Hermiston Corp.—4-page illustrated pamphlet No. 400 gives details and uses for Koppers Bituplastic protective coating that waterproofs and effects vapor seal. Material is recommended for above ground tanks, metal buildings, towers, fire escapes, roofs, etc.

56. Optical Instrument

Farrand Optical Co.—12-page illustrated bulletin No. 801 presents details of six models of ultraviolet monochromators with range of 200 to 950 millimicrons for research in this spectral field.

57. Industrial Truck Crane

Towmotor Corp. — Illustrated data sheet "Towmotor Accessory Data" presents information on industrial truck crane attachment which facilitates lifting, handling and transporting operations by means of hook on end of crane arm. Capacities range from 2000 to 9000 pounds.

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58. Processing Eqiupment

Vulcan Iron Works—28-page illustrated bulletin No. A-442 covers rotary kilns, coolers, dryers and other processing equipment. Diagrams show construction features and complete installations are described.

59. Magnetic Clutches

Stearns Magnetic Mfg. Co.—20-page illustrated catalog No. 226 contains information on magnetic clutch applications. Specifications, torque formulas and other information on magnetic friction device controls are included.

60. Crane Wheels & Assemblies

Downs Crane & Hoist Co.—12-page illustrated bulletin No. 3540 shows design and presents specifications of complete line of crane wheels and crane wheel assemblies.

61. Communications Equipment

Westinghouse Electric Corp.—44-page illustrated booklet No. B-3610 will provide designers of communication and electronic equipment with a list of available products. Materials for radio transmitters, receivers, radar, telephone, etc. are covered.

62. Motor Generators

Motor Generator Corp.—4-page illustrated data sheet MGC 37 lists specifications of four-circuit automatic charging equipment designed for charging storage batteries used in electric trucks.

63. Rust Preventive

Rust-Oleum Corp.—24-page illustrated booklet "Stops and Prevents Rust" deals with Rust-Oleum rust preventive which is self-leveling, easy to apply and capable of resisting acid fumes, alkali, grease, oil, water, exterior weather elements, brine, etc.

64. Beryllium Copper

Riverside Metal Co.—16-page bulletin "Riverside" is compilation of revised data which are intended to be of help to engineers and manufacturing organizations interested in use of beryllium copper. Physical constants, forms available, standard specifications, applications, heat treatment, fabrication and cleaning data are covered.

65. Chucking Machine

Hardinge Bros., Inc.—28-page illustrated catalog "Multi-Operation Chucking Machine" describes machine which can finish diameters, shoulders and end faces and cut precision threads in one setting and all concentric with each other. Features are shown by means of drawings and operating information is charted.

66. Lifting Magnets

Ohio Electric Mfg. Co.—8-page illustrated catalog No. 112 presents detailed information on construction features of magnets and magnet controllers as well as sizes, capacities and applications.

67. Industrial Control Devices

Brown Instrument Co.—56-page illustrated catalog No. 8302 contains information on electric and pneumatic automatic control systems. Schematic diagrams, dimensional drawings, specifications and range charts of these controls for temperature, pressure, flow liquid level and humidity are covered.

68. Deaerating Equipment

Cochrane Corp.—36-page illustrated catalog No. 3005 provides data on tray-type deaerating heaters and deaerators. Also discussed are atomizing deaerators for stationary and marine service, deaerating hot water generators, cold water deaerators and other degasification equipment.

69. Manufacturing Facilities

Bunell Machine & Tool Co.—4-page illustrated booklet contains information on company's facilities for producing special machines, tools, dies, jigs, fixtures and gages from blueprint to finished unit. List covering types of industries served is included.

70. Portable Potentiometer

Boder Scientific Co.—2-page illustrated data sheet No. BA502-4 describes sensitivity, standard and special ranges, features and specifications of Wheelco Series 300 portable potentiometer for checking and calibrating all types of temperature instruments.

71. Paging Systems

Autocall Co.—12-page illustrated brochure entitled "The Great Time Saver" describes electrically operated audible signaling service for locating key personnel for callers, phone calls, emergencies, etc. by means of chimes, bells, gongs and other audible signals.

72. Metal Cutting Machine

Maquoketa Co. — 4-page illustrated folder "SawMore" presents information on SawMore line of metal cutting machines which is particularly suitable for cold cutting of bars and shapes. Stock is fed automatically, machine swivels up to 45 degrees and spacer bar accurately determines length of pieces to be cut. Three models are covered.

73. Electric Fans

Emerson Electric Mfg. Co. — 28-page illustrated bulletin No. X5749 includes performance data and construction specifications on wide range of desk fans, air circulators, ceiling fans, and ventilating fans and accessories.

74. Production Facilities

Atlas Metal Stamping Co.—4-page illustrated booklet entitled "Product Design Is a Job for Engineers" discusses design analysis and creation, tooling, special machinery and production engineering facilities which are available.

75. Jib Cranes

Chicago Tramrail Co.—8-page illustrated bulletin No. J202 contains diagrams and tables giving capacities and dimensional data of jib mounted electric cranes for handling loads of up to 10,000 pounds and with jib lengths up to 30 feet.

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Improved Labor Picture Brightens Steel Outlook

CIO president forbids strikes for two years, asks meticulous observance of union's contracts. Prospects for soft coal peace improve. New contract signed with iron ore miners

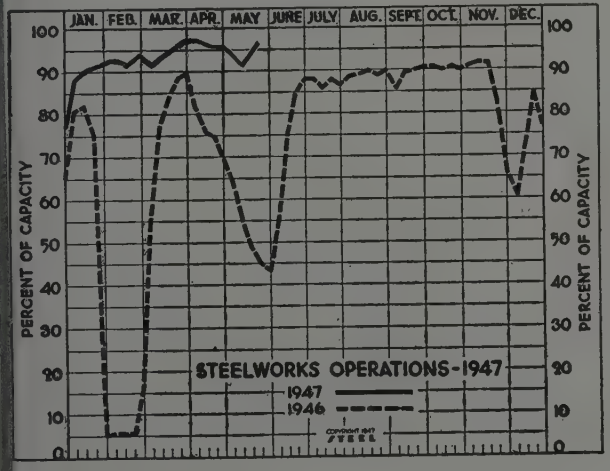
PROSPECTS for continued peak peacetime production of steel are bright. Labor relations in the industry are better than at any time previously this year and outlook for long-term peace is favorable. Scrap and other raw materials are flowing to the mills in volume that presages maintenance of operations at near capacity.

The steel labor picture was improved last week by orders from CIO President Philip Murray forbidding all strikes in steel for the next two years and demanding "meticulous respect" for the provisions of the union's contracts. If obeyed, this order would eliminate the hundreds of local work stoppages which have cost heavily in steel output since the war.

Danger of a soft coal mine strike at mid-year when the mines are returned to private operation appears to be lessening and steelmakers are fairly optimistic that coal operators and the miners will reach an agreement well before the deadline. The leading iron ore mining interest has signed a contract similar to the basic steel agreement and the pattern is expected to be extended to other companies operating in the upper lakes region.

The combination of these developments indicates no early diminution of steel mill operations which have been maintained at above 90 per cent of capacity for the past 20 weeks. Leading steelmakers attending the general meeting of the American Iron & Steel Institute at New York last week appeared optimistic concerning future production.

Estimated production for the week ended May 24 was at a rate of 96½ per cent of capacity, an increase of two points over the preceding week. Operations at Chicago rose 5½ points to 94½ per cent, 5 points at Cincinnati to 94 per cent, 3 points at Pittsburgh to 103 per cent, and 3 points at Detroit to 93 per cent. Elsewhere operations held unchanged.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended May 24	Change	Same Week 1946	Same Week 1945
Pittsburgh	103	+ 3	29	92
Chicago	94.5	+ 5.5	56	98.5
Eastern Pa.	91.5	None	37	92
Youngstown	93	None	13	89
Wheeling	93.5	None	68.5	92.5
Cleveland	91	None	79	94
Buffalo	86	None	35	83.5
Birmingham	99	None	44	90
New England	95	None	67	92
Cincinnati	94	+ 5	84	84
St. Louis	68.5	None	49.5	75
Detroit	93	+ 3	75	88
Estimated national rate	96.5	+ 2	45	93.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Present difficulties which consumers are encountering in obtaining steel to sustain their operations is traceable chiefly to the concentration of demand for a comparatively few types of steel rather than to the total tonnage being produced. Shortages are accentuated by the channeling of large tonnages into federal housing and railroad car construction programs, depriving other classes of consumers of their normal proportionate share.

Overall supply of light gage carbon sheet and strip is expected to remain below needs of many consumers through the remainder of this year, despite present record peacetime output which will be augmented later this year by installation of new rolling mill equipment and the speeding up of some of the present mills. Increased mill capacity for the production of tin plate is also expected to help relieve the tight supply situation in that product later this year.

Pressure for medium and large size carbon bars and all sizes of alloy bars has eased, deliveries being extended only four to six weeks. This is attributed mainly to the unbalanced inventories held by automotive and other consumer goods producers. Distribution of the smaller size carbon bars, however, remains under strict allocation.

Some progress has been made toward reducing the heavy order backlogs for plate, but this is due primarily to the conservative selling policy of producers rather than a let-up in demand. Volume of new business in structural shapes has been lighter recently, however, since high costs and uncertain supply of required materials has delayed many construction projects.

STEEL's composite price averages held unchanged last week at $69.82 for finished steel, $52.10 for semifinished steel, $32.49 for steelmaking pig iron and $29.42 for steelmaking scrap.

COMPOSITE MARKET AVERAGES

	May 24	May 17	May 10	One Month Ago Apr., 1947	Three Months Ago Feb., 1947	One Year Ago May, 1946	Five Years Ago May, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$63.54	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	32.49	29.59	25.50	23.00
Steelmaking Scrap	29.42	29.42	29.42	33.94	37.25	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	May 24, 1947	Apr., 1947	Feb., 1947	May, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.82
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.465
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.55
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.25
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	•$5.25

• Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods ⅜ to ¼-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to ⅝-in.

Pig Iron

	May 24, 1947	Apr., 1947	Feb., 1947	May, 1946
Bessemer, del. Pittsburgh	$34.83	$34.83	$31.83	$27.69
Basic, Valley	33.00	33.00	30.00	26.00
Basic, eastern del. Philadelphia	35.52	35.52	32.01	27.84
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	31.33	27.19
No. 2 fdry., del. Philadelphia	36.02	36.02	32.51	28.34
No. 2 foundry, Chicago	33.00	33.00	30.50	26.90
Southern No. 2 Birmingham	29.88	29.28	26.88	26.94
Southern No. 2, del. Cincinnati	34.75	34.15	31.75	28.34
Malleable, Valley	33.50	33.50	30.50	26.50
Malleable, Chicago	33.50	33.50	30.50	26.90
Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50	37.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	30.66	26.55
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.19	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$30.00	$35.80	$33.75	$20.00
Heavy melt. steel, No. 2, E. Pa.	28.00	33.50	32.25	18.75
Heavy melt. steel, Chicago	28.75	32.75	31.25	18.75
Rails for rerolling, Chicago	34.00	38.25	38.50	22.25
No. 1 cast, Chicago	35.50	42.50	42.50	20.00

Coke

Connellsville, furnace ovens	$9.125	$9.06	$8.875	$8.15
Connellsville, foundry ovens	10.375	10.375	9.875	8.90
Chicago, by-product fdry., del.	16.10	16.10	16.10	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, ⅜ to ¼-in., inclusive $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, corrugated: Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets: No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)
Floor Plates: Pittsburgh, Chicago, 3.90c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.
Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del.), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)
Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).
Wire to Manufacturers in carloads
Bright, basic or bessemer .....*$3.30-$3.55
Spring (except Birmingham) **$4.25
Wire Products to Trade
Nails and Staples
Standard and cement-coated.....†$3.75-$4.50
Galvanized .....‡$3.75-$4.50
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$3.95
Galvanized (6 to 8 base) ..... §$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier .... ††84
Barbed wire, 80-rod spool ..... ††94
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††90
Bale ties, single loop ..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.
** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.
† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.
†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), $2.95, Williamsport, Pa.
Relaying, 60 lb and over, fob railroad and basing point, $46-$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	¼—2		+20
¼ & ⅜	51	30½	⅜—11½		+10
½	55½	41	1-1¼ —17		+ 2
¾	58½	45	1½—22½		— 1½
1-3	60½	47½	2 —23		— 2

Lap Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼ —1		+20
2½-3	56	42½	1½ —7		+13
3½-6	58	44½	2 —14½		+ 5½
*8	58	42½	2½-3½—17		+ 1½
*10	57½	42	4 —21		— 4
*12	56½	41	4½-8 —19		— 2½
			9-12 —10		+ 7

* Not T. & C.

Seamless Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

	——Seamless——		—Elec. Weld—	
O.D. Sizes B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1" 13	....	$10.89	$10.62	$10.62
1¼" 13	....	12.90	10.59	12.58
1½" 13	$12.00	14.26	11.70	13.90
1¾" 13	13.65	16.23	13.31	15.82
2" 13	15.29	18.17	15.00	17.95
2¼" 12	17.05	20.26	16.71	20.00
2½" 12	18.78	22.31	18.38	22.00
2½" 12	20.57	24.43	20.11	24.07
2¾" 12	21 80	25.89	21.27	25.46
3" 12	22.87	27.18	22.26	26.68
3¼" 11	26.88	31.94	26.15	31.33
3½" 11	28.86	34.30	28.06	33.64
4" 10	35.82	42.55	34.78	41.68
4½" 9	47.48	56.42	....	....
5" 9	54.96	65.30	....	....
6" 7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length 55 off
⅝ and ⅝, up to 6 in. in length..... 52 off
¾ x 6 in. ..... 49 off
⅞ and 1 in. x 6 in. length..... 51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in. .. 48 off
½ in. and smaller, longer than 6 in. ... 45 off
Tire bolts .....38½ off
Step bolts ..... 46 off
Plow bolts ..... 57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller.....	51 off	.....
½-in. and smaller.....	.....	48 off
½-in.-1-in.	48 off	.....
⅝-in.-1-in.	.....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	.....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)..... 56 off
Upset (10-35 heat treated)
⅝ x 6 ..... 51 off
¾, ⅞, & 1 x 6..... 47 off

Square Head Set Screws

Upset 1-in. and smaller..... 61 off
Headless, ¼-in. and larger..... 46 off
No. 10 and smaller..... 56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural 5.25c
Lebanon, Pa. 5.40c
7/16-in. and under.....55-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl .....$1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	35.00	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O., del.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base).....$40.50
6.51-7.00..$41.50 9.01- 9.50. 46.50
7.01-7.50.. 42.50 9.51-10.00. 47.50
7.51-8.00.. 43.50 10.01-10.50. 48.50
8.01-8.50.. 44.50 10.51-11.00. 49.50
8.51-9.00.. 45.50 11.01-11.50. 50.50

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $65.75, Jackson, O.; $67, Niagara Falls; $68, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace..	*$8.75–$9.50
Connellsville, foundry .	9.75–11.00
New River, foundry...	12.50
Wise county, foundry.	11.15
Wise county, furnace..	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$10.10.

By-Product Foundry

Kearney, N. J., ovens.	$15.35
Chicago, outside del..	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, del.	12.35
Indianapolis, ovens ...	14.50
Cincinnati, del.	15.35
Ironton, O., ovens....	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens ...	14.50
Portsmouth, O., ovens.	14.00
Fairmont, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coke By-Products

Spot, gal, freight allowed east of Omaha

Pure and 90% benzol.....	17.00c
Toluol, two degrees.....	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots....	12.00c
Do., tank cars.....	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia.....	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	76.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio.....	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago.....	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome.....	59.00
Magnesite brick	81.00
Chem. bonded magnesite....	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer.....	$5.95
Old range nonbessemer.....	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos.....	Nom.
Swedish basic, 60 to 68%.	13.00
Spanish, No. African basic, 50 to 60%.....	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro.....	7.50–8.00

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$27–$28

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio .....$27-$27.50	
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio $27-27.50	
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	3.85	3.75–3.85	...	...	...
Cold-Rolled	4.55–4.75	4.55–4.75	4.55–4.75	4.75	...	4.55–4.75	...	...	...
Galvanized	5.40	.....	.....	...	...	.....	...	...	...
Strip, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes.	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp., Detroit.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS				STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R	C-F	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	....	5.27[8]	5.47[8]	....	4.62	....	4.62	5.17	8.42[13]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[8]	5.37[8]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.24	5.73[9]	5.33[9]	5.29[8]	6.54[5]	4.43	5.28	4.48	5.38	6.87	4.22	4.44	5.93
Philadelphia (country)	4.14	5.63[9]	5.23[9]	5.19[8]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.84	5.83
Baltimore (city)	4.09	6.15[8]	5.65[8]	5.14[8]	6.39[5]	4.40	..	4.45	5.10	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[8]	5.55[8]	....	....	....	....	....	....	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[8]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.05	....	4.75[6]	5.35[8]	....	4.30	5.25	4.10	4.75	....	4.10	4.65	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[8]	....	3.90	4.85	3.95	4.60	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.05	5.20[8]	4.75[8]	5.10[8]	6.35[5]	4.05	5.00	4.10	4.75	6.60	4.10	4.30	5.60
Pittsburgh (country)	3.90	5.05[8]	4.60[8]	4.95[8]	6.20[5]	3.90	4.85	3.95	4.60	6.60	3.95	4.15	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	4.87[12]	7.01	4.42	4.49	5.92
Cleveland (city)	4.05	5.20[8]	4.75[8]	5.238[8]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	3.90	5.05[8]	4.60[8]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.116	5.266[8]	....	5.166[8]	....	4.394	....	4.403	5.303	....	4.444	4.553	5.944
Chicago (city)	4.05	5.20[8]	4.75[8]	5.10[8]	6.35[5]	4.05	5.10	4.10	4.75	6.60[12]	4.10	4.25	5.75
Chicago (country)	3.90	5.05[8]	4.60[8]	4.95[8]	6.20[5]	3.90	4.95	3.95	4.60	6.60[12]	3.95	4.10	5.60
Milwaukee	4.249	5.399[8]	4.949[8]	5.299[8]	6.549[5]	4.249	5.299	4.299	4.949	6.899	4.299	4.449	5.949
St. Paul	4.384[1]	5.534[8]	5.084[8]	5.434[8]	6.684[5]	4.404[13]	....	4.434[13]	5.726[11]	7.084[11]	4.434[13]	4.684[13]	6.084[13]
Indianapolis	4.04	....	4.84[8]	5.29[8]	6.54[5]	4.24	....	4.36‡‡	5.26	....	4.36	4.61	6.01
St. Louis	4.199	....	4.899[9]	....	6.674[5]	4.199	....	4.249	5.324[12]	7.074	3.999	3.999	5.999
Birmingham (city)	3.85[20]	....	....	5.20[8]	....	4.10[20]	....	4.05[20]	5.83	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[8]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.46[20]°°°	....	5.77[8]	....	....	4.83[20]	....	4.78[20]°°	5.94[11]	....	4.68[20]°°	5.03[20]	6.94[20]
Houston, Tex.	5.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	....	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.868	6.118[8]	....	5.918[8]	7.168[5]	4.862	....	4.918	5.818[11]	....	4.918	5.068	6.568
Los Angeles	5.55	....	7.10[8]	....	8.10[8]	5.65	8.35	5.10	6.90[19]	7.85	5.20	5.10	7.20
San Francisco	4.90§§	....	6.30[8]	....	7.35[8]	5.20[14]	8.35[14]	4.75[14]	°°°	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	....	....	....	6.30[8]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[19]	4.95[17]	5.15[17]	7.25[17]
Seattle	5.00[17]	....	....	6.30[8]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[19]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [3]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [6]—450 to 1499 pounds; [7]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds.

° Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; °°° rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44; Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.25; contract, $2.08; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 14.10c; 2000 lb to c.l. 15.60c; central 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ⅛ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max, Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Zr 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Scrap Price Tone Weakens

Results in reduction of ½ to 1-cent a pound in brass ingot . . . Other markets hold steady to firm

NEW YORK—Weakness developed in scrap metal markets last week and was particularly pronounced in brass grades. As a result, brass ingot makers reduced prices ½ to 1-cent a pound. This is the second reduction in less than one month, prices having been cut ¾ to 1-cent a pound on Apr. 22. Both the scrap brass and scrap copper markets are described as glutted. Supply of heavy copper wire scrap has reached the stage where custom smelters cannot find the necessary storage space and have withdrawn temporarily from the market as buyers of that grade.

Prices of secondary aluminum, as well as those for all major primary metals, held unchanged.

COPPER—Primary copper price situation continued confused with domestic mine producers booking their daily quotas on the basis of 21.50c and other sellers at 24.00c. A small volume of business was done on export account at 23.75c, fas New York.

Suspension of the four-cent import tariff on copper has necessitated revision of the monthly domestic statistics, since "duty free" copper passed out of existence for the suspension period. All copper in the United States, regardless of origin, starting with the April figures, is being included in the published totals. Efforts are being made to secure statistics covering foreign production, deliveries and stocks so that a more comprehensive picture can be obtained of the world copper position.

Production of refined copper in the United States, including both domestic and foreign mined metal, totaled 107,270 tons. During March, production of refined copper solely from domestic origin metal totaled 88,131 tons, according to the Copper Institute.

Stocks of refined copper in the United States at the end of April amounted to 87,139 tons against 81,741 tons on hand at the beginning of the month. These totals included both foreign and domestic origin metal and compared with 69,727 tons on hand Mar. 31 which comprised only domestic stocks.

Total deliveries of copper to domestic consumers last month aggregated 120,089 tons against 123,590 tons in March. In addition, 222 tons were exported.

Of the April shipments to manufacturers in this country, 97,000 tons were domestic and 23,089 tons were foreign metal. In March, 93,049 tons were domestic and 35,541 tons were foreign.

Production from primary and custom smelter sources totaled 88,817 tons in April against 84,356 tons in March.

BRASS INGOTS: Brass and bronze ingot makers reduced prices of nearly all grades ½ to 1-cent a pound, effective as of May 20. The reduction was due to easiness in red metal scrap prices and to a sharp falling off in demand for ingots.

LEAD—Bookings are still restricted to the daily quotas which custom smelter and producing interests have established for June delivery. Only in this way can the limited supplies be distributed equitably. Prices held unchanged at 14.80c to 14.85c, East St. Louis.

Secretary of the Interior Krug reported last week that lead recoverable from measured and indicated ore by present technological methods is equivalent to the domestic needs for only 13 years at an estimated minimum peacetime rate of 500,000 tons of primary metal per year.

ZINC—Domestic mine production of zinc declined to an average daily rate of 1774 tons in March from 1824 tons in February, according to the Bureau of Mines. March zinc output totaled 54,991 tons of recoverable metal, or an increase of 17 per cent above the 1946 monthly average and of 8 per cent above the corresponding month last year. Prices held on basis of 10.50c, East St. Louis, for prime western.

TIN—First shipment of Siamese tin ever to arrive in this country was recorded last week. While only totaling about 50 tons, it marks the beginning of what may develop into moderately large shipments. In addition, substantial quantities of Siamese tin concentrates likely will be received at the Longhorn smelter. Prices held unchanged last week at 80.00c, New York, for grade A tin.

SILVER—No new developments were noted in silver, Handy & Harman's "official price" holding at 72.75c per fine ounce.

ALUMINUM—The only completely-equipped aluminum press-forging plant immediately available in war surplus is being offered for sale or lease by War Assets Administration. The plant, which cost the government $9 million, is the former Shenango Works of the Carnegie-Illinois Steel Corp., and was operated during the war by Aluminum Co. of America. Greatest value of the property lies in the machinery and equipment included in the offer. Among the items of a production and fabrication nature which are located on the site are 27 slug-heaters, 14 forging presses, 3 blanking presses, 18 trim presses, 11 electric heat-treating furnaces, and 5 ageing ovens. Also included are cranes and monorails, machine and portable tools, laboratory and testing devices, office furniture and fixtures. Sealed bids for this property must be submitted on approved forms to the WAA regional office, Cleveland, not later than 3 p.m. July 8.

Insert Nonferrous Metals

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c-24.00c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 21.25c, refinery, 20,000 lb or more; 21.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 15.75c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.00c-15.25c; No. 12 foundry alloy (No. 2 grade) 14.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.50c; grade 2 (92-95%) 14.50c; grade 3 (90-92%) 13.75c; grade 4 (85-90%) 13.25c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlot; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c, 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $85-$88 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 72.75c per ounce.

Platinum: $59-$62 per ounce.

Palladium: $24 per troy ounce.

Iridium: $85-95 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c, red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c, 500 to 1000 lb, 95.25c, 200 to 500 lb, 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00c, No. 2 copper 17.00, light copper 16.00, composition red brass 15.75, auto radiators 12.25, heavy yellow brass 11.25, brass pipe 11.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.50-19.75; No. 2 copper, 18.50-18.75, light copper, 17.25-17.50; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.75-16.25; light copper 14.50-15.00; No. 1 composition red brass 14.00-15.00, No. 1 composition turnings 13.00-14.50, mixed brass turnings 9.00-10.50, new brass clippings 11.50-12.50, No. 1 brass rod turnings 11.00-11.50, light brass 8.00-10.00, heavy yellow brass 9.00-10.00, new brass rod ends 11.50-12.00, auto radiators, unsweated 10.50-12.00, cocks and faucets 11.00-12.50, brass pipe 10.00-11.00.

Lead: Heavy lead 11.75-12.25, battery plates 7.00-7.50, linotype and stereotype 13.00-13.25, electrotype 11.25-12.00, mixed babbitt 13.75-14.25, solder joints 14.50-15.50.

Zinc: Old zinc 5.25-5.50, new die cast scrap 4.50-5.00, old die cast scrap 3.75-4.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 6.50-7.50, crankcase 6.25-6.75, borings and turnings 2.25-3.50, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 19.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00-10.00, old sheet 11.00-12.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	30.00
No. 1 Busheling	30.00
Nos. 1, 2 & 3 Bundles.	30.00
Machine Shop Turnings.	26.00-27.00
Mixed Borings, Turnings	26.00-27.00
Short Shovel Turnings.	28.00-29.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	37.00-37.50
Low Phos. Cast Steel	37.00-37.50
Punchings & Plate Scrap	37.00-37.50
Elec. Furnace Bundles.	37.00-37.50
Heavy Turnings	31.00-31.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	39.00-40.00
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast.	33.00-34.00
Stove Plate	37.50-38.00
Unstripped Motor Blocks	37.50-38 00
Malleable	45.50-46.00
Brake Shoes	35.00-36.00
Clean Auto Cast	41.50-42.50
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.50-35.00
R.R. Malleable	44.50-45.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	35.00-36.00
Rails, 3 ft and under	38.00-39.00
Rails, 18 in. and under.	38.50-39.50
Railroad Specialties	41.00-42.00
Uncut Tires	37.00-38.00
Angles, Splice Bars	37.00-38.00

CLEVELAND

No. 1 Heavy Melt. Steel	$30.50-31.00
No. 2 Heavy Melt. Steel	30.50-31.00
No. 1 Busheling	30.50-31.00
Nos. 1 & 2 Bundles	30.50-31.00
Machine Shop Turnings.	25.50-26.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings.	27.00-28.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	33.50-34.50
Cast Steel	33.50-34.50
Punchings & Plate Scrap	33.50-34.50
Elec. Furnace Bundles.	31.50-32.00
Heavy Turnings	30 00-30.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	37.50-38.00

Cast Iron Grades

No. 1 Cupola	43.00-45.00
Charging Box Cast	38.00
Stove Plate	38.00
Heavy Breakable Cast.	38.00
Unstripped Motor Blocks	40.00
Malleable	52.00-55.00
Brake Shoes	42.00
Clean Auto Cast	45.00
No. 1 Wheels	42.00
Burnt Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-35.00
R.R. Malleable	52.00-55.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	38.00-39.00
Rails, 3 ft and under	44.00
Railroad Specialties	42.00
Uncut Tires	41.00
Angles, Splice Bars	44.00

VALLEY

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 2 Heavy Melt. Steel	31.00-31.50
No. 1 Bundles	31.00-31.50
Machine Shop Turnings.	26.00-27.00
Short Shovel Turnings.	28.00-29.50
Cast Iron Borings	28.50-29.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-35.00

MANSFIELD

No. 1 Heavy Melt. Steel	$31.00-31.50
Machine Shop Turnings.	26.00
Short Shovel Turnings.	28.00

CINCINNATI

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	27.00
No. 1 Bundles	27.00
No. 2 Bundles	27.00
Machine Shop Turnings.	20.00
Mixed Borings, Turnings	19.00
Short Shovel Turnings.	22.00
Cast Iron Borings	21.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	31.00
Heavy Breakable Cast.	32.00
Stove Plate	29.00
Unstripped Motor Blocks	32.00
Brake Shoes	28.00
Clean Auto Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	42.00
Rails, Rerolling	35.00
Rails, Random Lengths	35.00
Rails, 18 in. and under.	42.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$24.50-25 00
No. 1 Busheling	24.50-25.00
Nos. 1 & 2 Bundles	24.50-25.00
No. 3 Bundles	24.50-25.00
Machine Shop Turnings.	21.50-22.00
Mixed Borings, Turnings	21.50-22.00
Short Shovel Turnings.	22.50-23.00
Cast Iron Borings	22.50-23.00
Punchings & Plate Scrap	30.00-30.50

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast.	25.00-27.00
Clean Auto Cast	33.00-34.00

BUFFALO

No. 1 Heavy Melt. Steel	$32.50-33.50
No. 2 Heavy Melt. Steel	29.00-31.00
No. 1 Busheling	29.00-31.00
Nos. 1 & 2 Bundles	29 00-31.00
Machine Shop Turnings	22.00-22.50
Mixed Borings, Turnings	22.00-22.50
Cast Iron Borings	22.00-22.50
Short Shovel Turnings.	24.00-24.50
Punchings & Plate Scrap	34.00-35 00
Elec. Furnace Bundles.	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-38.00
Charging Box Cast	29.00-30.00
Heavy Breakable Cast.	34.00-35.00
Stove Plate	33.00-35.00
Malleable	40.00-41.00
Clean Auto Cast	38 00-39.00
No. 1 Wheels	38.00-39.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Busheling	27.50-28.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.50-26.00
No. 3 Bundles	23.50-24.00
Machine Shop Turnings	22.50-23.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings.	23.50-24.00
Bar Crops and Plate	31.00-32.00
Punchings & Plate Scrap	31.00-32.00
Cut Structurals	31.00-32.00
Elec. Furnace Bundles.	30.00-31.00
Heavy Turnings	29.50-30.00
No. 1 Chemical Borings	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-41.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	37.00
Unstripped Motor Blocks	36.00-36.50
Malleable	46.00-48.00
Clean Auto Cast	39.00-41.00
No. 1 Wheels	42.00-43.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$24.00-25.00
No. 2 Heavy Melt. Steel	24.00-25.00
No. 1 Busheling	23.00-24.00
Nos. 1 & 2 Bundles	23.00
No. 3 Bundles	22.00
Machine Shop Turnings.	17.50
Mixed Borings, Turnings	17.50
Short Shovel Turnings.	18.50-19.00
Punchings & Plate Scrap	27.00-28.00
Elec. Furnace Bundles.	25.00-26.00
Cut Structurals	27.00-28.00
No. 1 Chemical Borings	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	34.00-35.00
Heavy Breakable	31.00-32.00
Unstripped Motor Blocks	32.50-33.50
Malleable	46.00-48.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$23.00
No. 2 Heavy Melt. Steel	23.00
Nos. 1 & 2 Bundles	23.00
No. 1 Busheling	21.00
Machine Shop Turnings.	17.00
Mixed Borings, Turnings	16.50
Short Shovel Turnings.	18.00
Bar Crops and Plate	27.00
Punchings & Plate Scrap	27.00
Chemical Borings	20.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	36.00
Heavy Breakable Cast.	38.00
Stove Plate	35.00
Unstripped Motor Blocks	30.00
Clean Auto Cast	40.00

CHICAGO

No. 1 Heavy Melt. Steel	$28.50-29.00
No. 2 Heavy Melt. Steel	28 50-29.00
Nos. 1 & 2 Bundles	28.50-29.00
No 3 Bundles	26.50-27.00
Machine Shop Turnings.	23.00-24.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings.	25.00-26.00
Cast Iron Borings	24.00-25.00
Bar Crops and Plate	31.00-31.50
Cast Steel	31.00-31.50
Punchings	31.00-31.50
Elec. Furnace Bundles.	29.50-30.00
Heavy Turnings	28.00-28.50
Cut Structurals	30.50-31.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-40.00
Malleable	35.00-40.00
Clean Auto Cast	35.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
Rails, Rerolling	33.50-34.50
Rails, Random Lengths	32.50-33.50
Rails, 3 ft. and under	36.50-37.50
Rails, 18 in. and under	37.50-38.50
Railroad Specialties	34.50-35.50
Angles, Splice Bars	34.50-35.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	26.50-27.50
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings.	21.00-22.00

Cast Iron Grades (Fob shipping ponit)

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	32.00-33.00
Heavy Breakable Cast.	29.00-30.00
Stove Plate	30.00-33.00
Brake Shoes	31.00-33.00
Clean Auto Cast	35.00-36.00
No. 1 Wheels	34.00-35.00
Burnt Cast	30.00-32.00

Railroad Scrap

R.R. Malleable	40.00-45.00
Rails, Rerolling	30.00-33.00
Rails, Random Lengths	29 00-30.00
Rails, 3 ft and under	36.00-37.00
Uncut Tires	32.00-34.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	27.00
Nos. 1 & 2 Bundles	27.00
No. 3 Bundles	25.00
Long Turnings	22.00
Short Shovel Turnings.	24.00
Cast Iron Borings	23.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	36.00-37.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Stove Plate	34.00-35.00
No. 1 Wheels	32.00-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R.R. Malleable	37.50-38.00
Axles, Steel	33.00
Rails, Rerolling	36.00-37.00
Rails, Random Length	30.00-31.00
Rails, 3 ft and under	32.00-33 00
Angles and Splice Bars	32.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings.	*12.54
Bar Crops and Plate	18 00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths.	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20 00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings.	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars.	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings.	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles.	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

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Sheets, Strip. . .

Demand for narrow cold-rolled strip noted in New England district

Sheet Prices, Page 146

Boston — Slight easing in new orders for narrow cold-rolled strip is attributed to early duplications, unbalance in inventories, better supplied pipe lines in some consumer goods and a more general conservative buying policy among most consumers. Pressure on producers for steel has slackened little, however, and limited supply of hot-strip for cold-rolling, notably for certain sizes and grades, hampers efforts of nonintegrated mills in making inroads against backlogs. Production and shipment statistics thus far this year indicate both are higher on hot-rolled, but lack of rounded tonnage continues with re-rollers. Substantial part of this increase is taken up by cold finishing facilities of producers. One hot-strip mill is withdrawing from the market and is concentrating on tin plate. Others have reduced outside tonnage to supply their own heavier outlets. Actually one producer is carrying a high ratio of the load. Outlook for increased volume on most finishes and grades of flat-rolled is uncertain.

New York — Sheet consumers are not receiving nearly the tonnage they desire and in some cases are having to virtually suspend operations for limited periods. However, it is not in all cases due to shortage of sheets alone but rather to other supplies as well. For instance, there is a severe shortage of metal screws which is handicapping production at some plants.

Steel sheet producers generally are promising a little more tonnage in the third quarter, although there are important exceptions; some report no improvement whatsoever and one large interest is simply blanking out the entire period, excepting for the railroad and housing requirements, because of heavy arrearages.

There is some improvement in shipments of specialties, notably stainless, which now is generally available in two months or less, and to a certain extent in enameling stock. In silicon sheets, the situation is a bit mixed. Deliveries offered by some sellers are better than they were earlier in the year, although still running behind requirements, while at least one producer is unable to promise as good deliveries as heretofore, due principally to shifting of production of this material from one plant to another.

Pittsburgh — No let-up in pressure for early sheet or strip shipments is noted as in other steel products. Many metalworking companies have for months been tooled-up for record output of civilian goods, but limited sheet tonnage available has restricted production schedules to date. This situation in turn has resulted in an unbalanced inventory position of other steel items. Uninterrupted production through September should relieve the delivery pressure somewhat for most sheet and strip items. However, the overall supply is expected to remain below immediate needs of many consumers through remainder of this year, despite indicated record peacetime mill output which will be augmented later this year by installation of new rolling mill equipment and speeding up of some of the present mills. In some instances this shortage will be temporarily accentuated due to the down-time resulting from installation of the new equipment for the speeding up of rolling mills, and in replacement of hand mills with modern cold-reduction units, as on West Coast.

Philadelphia — Sheet supply continues as stringent as at any time this year, although on an average there may be a little more available in the third quarter. Certain leading producers indicate that even in the third period they may not be able to supply the regular trade with any more tonnage than at present. The reduction in housing requirements of about 15,000 tons for the quarter will help a little, but railroad car requirements will be up, and most if not all producers will have quite a carryover.

The Alan Wood Steel Co., Conshohocken, Pa., and the Jessop Steel Co., Washington, Pa., have entered into an arrangement for the production of stainless-clad steel sheets, with additional treating and pickling facilities to be installed at Conshohocken, so that the production program can get well under way this fall. Alan Wood will furnish the soft steel and Jessop the stainless, with the stainless-clad product to be produced under a Jessop patent. At present, pending installation of equipment at Conshohocken, a limited amount of the stainless-clad will be produced at Washington, it is understood.

Chicago — Only stainless sheets and strip are in adequate supply, all carbon grades being as tight as ever. Demand exceeds shipments by a wide margin and consumers in all fields are pressing for faster deliveries and even increased quotas. There is no indication that supply and demand of sheet and strip will come into reasonable balance any time this year. All producers are going to have substantial carryovers at end of second quarter, and with production as near full capacity as can be obtained under present conditions some slight paring down of customers' quotas in third and fourth quarter most likely will be required.

Cincinnati — In drafting sheet mill schedules for third quarter, mills were under constant pressure to expand allocations. Housing needs will take somewhat less tonnage in third quarter but a counteracting influence is seen in heavier requirements for the freight car program. Other consumers, including makers of automobiles and household equipment, stand to get about the same volume as in second quarter.

St. Louis—A strike at Granite City Steel Co. has held sheet production here to 40 per cent of capacity for three weeks, extending delivery dates in proportion. Cold-rolled sheet schedules are filled to year's end, even though 1947 books have not been opened. Construction of new cold rolling capacity, due for completion in June, has been set back to October.

Plans Greater Output of Stainless-Clad Sheets

Large-scale production of stainless-clad steel sheets by Jessop Steel Co., Washington, Pa., and Alan Wood Steel Co., Conshohocken, Pa., is provided for in an agreement between the two companies.

The agreement is expected to contribute greatly to meeting the current demand for stainless-clad steel sheets in food processing and architectural industries. In addition it is seen by both companies' spokesmen as a move to meet the future expanded demand for the material in new applications, particularly in the automotive and home appliance fields.

Steel Bars. . .

Supply of medium and large sized hot-rolled carbon bars tightens

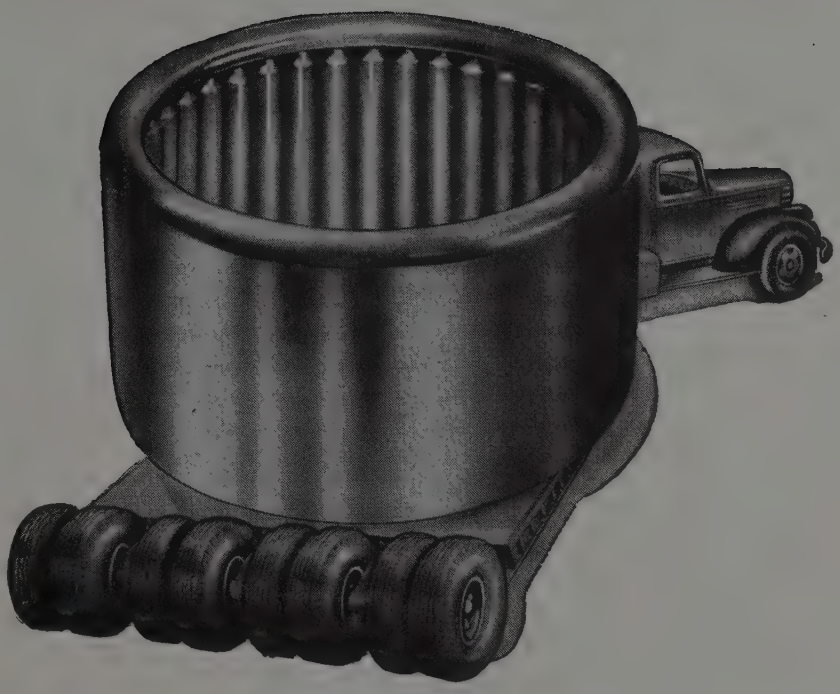
Bar Prices, Page 146

Philadelphia — While hot-rolled carbon bars have been among the few major products to show a little easing in supply over the past few months, the situation recently has stiffened. Some producers have been able to offer a little more tonnage for third quarter than for the current period; however, certain sellers now find, especially as they set up their quotas for the closing weeks of next quarter, that they may not have any more tonnage to offer than at present. Of course, on the small sizes of hot carbon bars there has been no easing at any time, but at present some sellers' supply of medium sizes will not be quite so large this summer as they had contemplated.

The general situation in cold-finished carbon bars continues less stringent than in hot carbon bars, excepting for the very small sizes; and in alloy material, deliveries remain easy, probably averaging four to six weeks on the hot grades.

New York — Despite a slightly easier trend, hot carbon bar deliveries are still tight, especially in the small sizes. The outlook for third quarter is a little more promising but not as good as some anticipated only a few weeks ago. However, the feeling persists that if operations can only be continued at their present high rate over the next few months, a noticeable easing should develop by late summer or early fall. Cold-finished carbon bars generally are in easier supply than hot-finished, although there is little difference when it comes to the small sizes, ⅝-inch and less. Alloy bars, both hot and cold-rolled, can be had for delivery within a few weeks; hot alloy, within four to six weeks; cold-rolled, a little longer on an average.

Pittsburgh—Distribution of carbon and cold-finished bars remains under strict allocation in smaller size ranges. However, in the larger sizes deliveries are extended only four to six weeks on merchant carbon bars and five to seven weeks for cold-drawn bars. Alloy bars in nearly all size ranges are available within four to six weeks. Some easing in bar demand is noted from automotive and other sources, due to unbalanced steel product inventories. In many instances manufacturing schedules are limited to sheet tonnage in stock, with result inventories of other steel items have tended to get out of line with present production schedules. Shortage of component parts continues to restrict machine tool production schedules, which in turn has resulted in lessening in immediate bar requirements. Cold finishers report better mill deliveries of hot-rolled bars with result inventories are in better balance, permitting more economical and higher production schedules.



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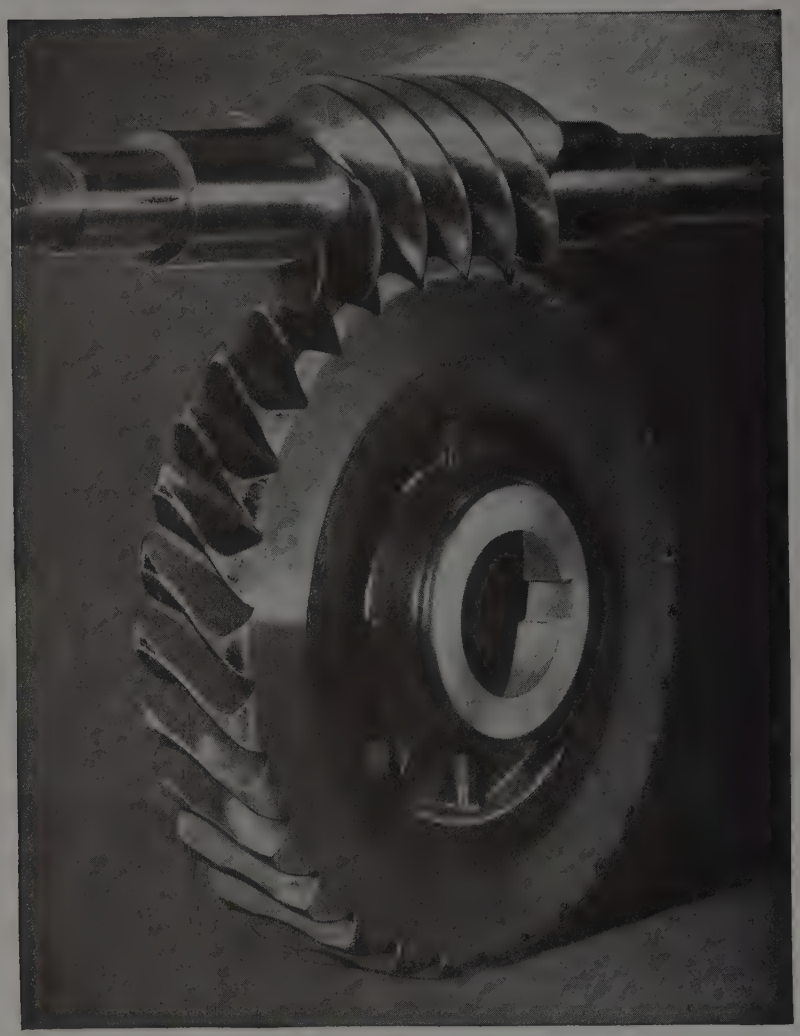

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Steel Plate. . .

Plate Prices, Page 147

New York — Featuring tank work is the award of 6000 tons by the Pacific Gas Corp. for 150 propane tanks, placed with the Bethlehem Steel Co., Bethlehem, Pa. Plate mills generally are selecting tonnage with care. Those that are selling on a quarterly basis are already sold up for the third quarter, and those who are not are choosing only the more attractive work offered rather than attempting to accept all the tonnage that is available and thus build their backlogs too far into the future. This means that little new tonnage can be placed before the fourth quarter except in cases where the mills have fabricating facilities and are given an opportunity to do some forming operations.

Philadelphia — Plate demand is still pressing and while producers are getting caught up somewhat on their backlogs, it is due primarily to the conservative policy of the mills in accepting new tonnage. Some producers are quoting on a quarterly basis and hence are accepting nothing for shipment beyond. Others are taking orders over the remainder of the year, but are selecting only the more attractive tonnages. Some plates can be had for delivery before the end of the third quarter against new orders, but generally only where buyers are able to give the mills some pre-fabricating work along with it. Producers are making some progress as a result of this broad policy in getting caught up on their arrearages. At least one producer is now behind only about two weeks, or would be were he able to lump all arrearages together and run solidly on them. However, it might be expected, this interest has tonnage on his books which is overdo by several weeks.

St. Louis—Plate supply is critical, due to heavy gas pipeline order. Buyers are taking all over-roll and even reject tonnages.

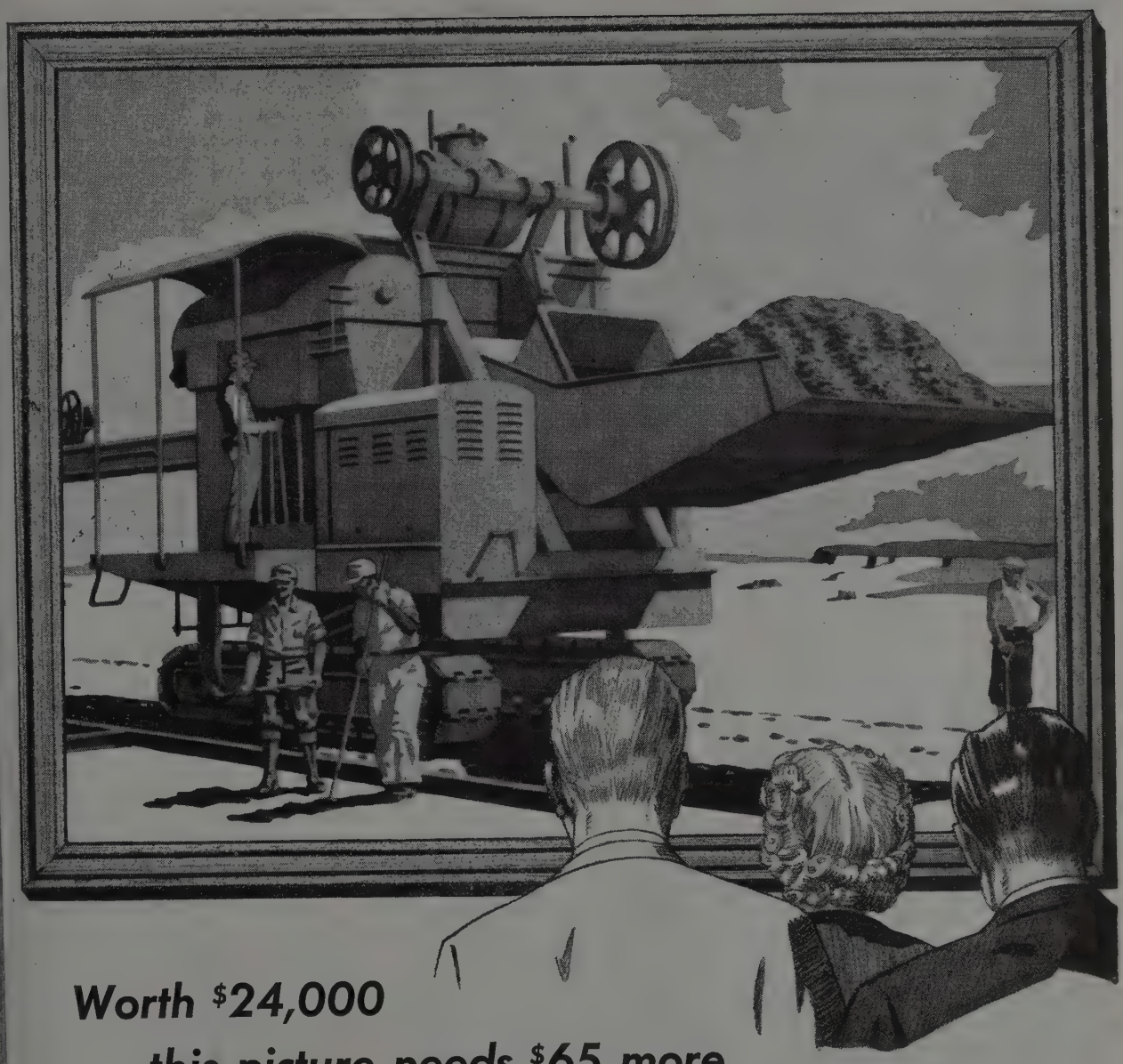
Seattle—Shops report a steady volume of small jobs requiring small tonnages of plates. No large projects are immediately pending but several will develop in the near future. Several oil companies in this area are planning terminal storage expansion, involving additional tanks.

Wire. . .

Wire Prices, Page 147

Chicago—Demand for manufacturers wire holds strong, and exceeds production by a wide margin. This applies particularly to high carbon spring wire and cold heading wire. There is some resistance to be noted on spring wire prices. While cancellations on manufacturers wire seem more numerous, these occur in items which gives no help to the overall situation. Requirements for merchant products also are at high level, and dealers seek to take their full quotas of wire in specific items which are short. Inventories are short and they are more firm in declining to accept substitutes. Some relief is coming from furniture manufacturers, who are leveling off operations in keeping with consumer demand and are keeping inventories of materials as low as possible. Demand for wire rope is good.

Boston—Openings in wire mill schedules are readily filled with backlog tonnage, but cancellations and deferments



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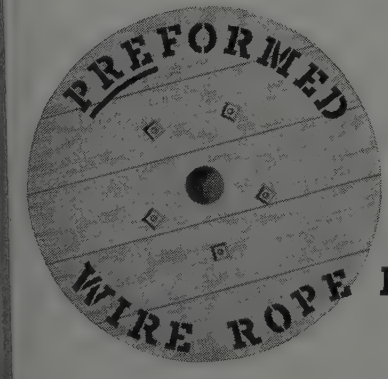

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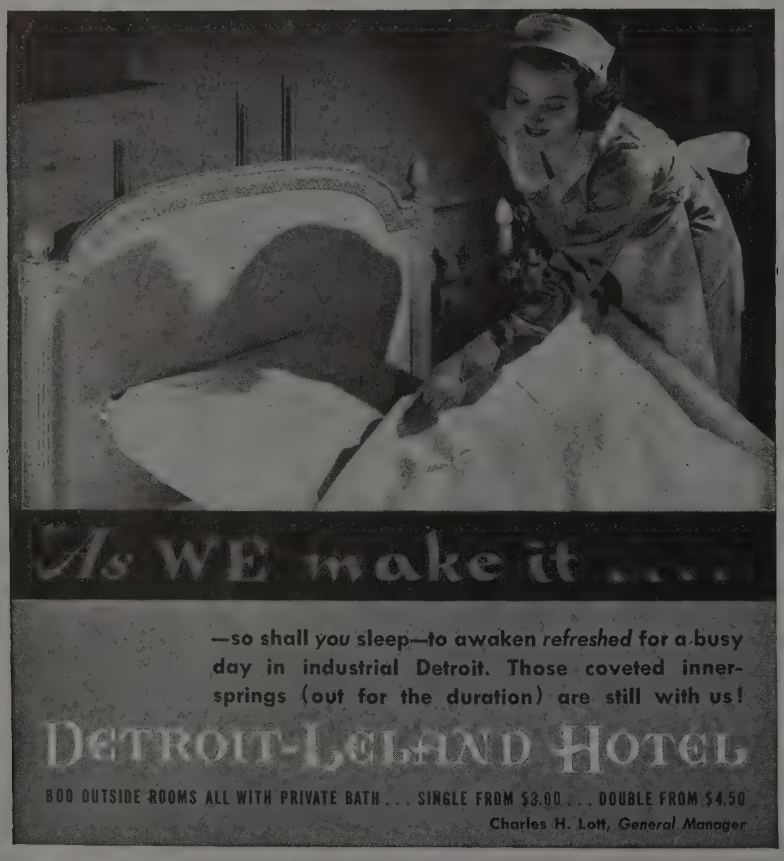
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Charles H. Lott, General Manager

indicate that some consumers have reached the conclusion they have too many orders outstanding based on current inventories. New orders also are down slightly, although mills are sold ahead at least six months on numerous items. Approaching an easier position in music wire, spring maker inventories are in better shape and capacity for this grade, built up during the war years, has contributed toward balancing supply. Rod supply is improving in spots and slightly larger tonnages of finished wire are offered, including round basic for flattening.

Tubular Goods. . .

Tubular Goods Prices, Page 147

St. Louis—Pipe demand continues to increase despite a marked slowdown in construction work here. Small sizes, under 2 inches, are in especially tight supply. Producers had expected the situation to ease in response to a virtual building strike locally because of high prices. Commercial building repair work, however, seems unabated. Pipemakers believe inventories of distributors are so low the demand will be unrelieved for several months. Pipe schedules are filled to the end of the year and deliveries are 10 months behind.

Seattle—Cast iron pipe market is lethargic due to uncertain and deferred deliveries, ranging from 18 to 24 months. Potential demand in this area is of major proportions and promises an active market as soon as materials are more readily available. Steel pipe continues in fair demand.

Tin Plate. . .

Tin Plate Prices, Page 147

Chicago—Inventories of tin plate in hands of customers are low, and producers are pressed not only for faster shipments but increased allotments as well. The situation would be worse than it is with canmakers were it not for the fact that crop reports are not too encouraging. For example, in some parts of the country the pea crop will be far below expectation because of unfavorable weather. Manufacturers still seek more plate for cans, however, because container inventories are far below normal.

Pittsburgh—Tin plate producers continue under heavy pressure to meet overall requirements with most interests reporting output still falling far short of stated demand. However, a gradual easing in domestic tin plate requirements may develop late in the third and fourth quarters. This may result from the large carryover of certain food packs plus fact sale of canned goods has not been up to previous expectations, while unseasonal spring weather has delayed planting of some crops. Reflecting this situation is the decision of American Can Co. to discontinue its allocation program July 1. Sellers report export tin plate requirements are far in excess of directive tonnage commitment, while demand for oil, beer, dog food and similar general line containers is not being met in most instances.

Of particular significance in tin plate supply outlook is the increased tin mill capacity expected to be made available soon to the industry. By July 15, Weirton Steel Co. will have its new 5-stand 4-high cold-reduction strip mill operat-

ing on a full production basis, which will make possible an increase of 50 per cent in theoretical tin plate capacity. To accomplish this, however, it will be necessary to speed up the electrolytic lines and the zinc electroplating line will have to be turned over to electrolytic tinning operation. Jones & Laughlin Steel Corp. will have its new high-speed tin mill in operation later this year. Carnegie-Illinois Steel Corp. plans to modernize and speed up two cold-reduction tin mills at Gary, Ind.; while Inland Steel also will soon have increased capacity.

Structural Shapes. . .

Structural Shape Prices, Page 147

Boston—On public work contracts escalator clauses give way to firm quotations, but contingency risks are usually taken into account by structural steel fabricators bidding this class of construction.

Low bid on 680 tons, fixed spans, Hampton Harbor, N. H., bridge brought out a low of 14.50 cents per pound in place (American Bridge Co.) and 24.90 cents, 105 tons, bascule span (Phoenix Bridge Co.); latter is low on the complete contract, $514,868.21 against $586,655, American Bridge Co. Low unit bids on other materials include: Roadway grating, square foot, $3.43; bridge railing, linear foot, $11.30; trunnions and trunnion bearings, per pound 52.62 cents; sidewalk grating, square foot, $3.10.

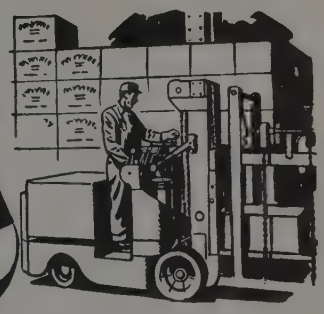
Small bridges in New England, bids in on most contracts, take approximately 600 tons additional; Electric Boat Co., Groton, Conn., has steel contracts for two two-span structures, that state 225 tons. Most federal aid work is delayed. Inquiry for commercial and industrial construction is shrinking with considerable tonnage held up by high costs.

New York — Dullness still characterizes the local structural market. Inquiries are scattered, with awards light. High cost of materials and labor, with uncertainty as to how much higher these costs might go, continues to hold construction work in check. Most fabricators still have fairly substantial backlogs, but some are showing livelier interest in figuring on new work. Meanwhile, shape mills are still behind on orders, but it is believed that third quarter will see some producers fully caught up, with a possibility that there will be little rationing of tonnage by producers for the fourth quarter, unless there is some sharp improvement in building work.

Philadelphia—Structural activity continues restricted, with the placing of 160 tons for a city bridge over Cobbs Creek among the few outstanding awards in this district. Shape mills are making some headway on backlogs and it would not prove surprising if some producers should be caught up on arrearages early in the third quarter. At present, deliveries on standard shapes are better than on wide flange. However, jobbers are pressing for small standard sections, including bar angles and columns and beams ranging from 8 to 16 inches. In some instances resellers' stocks are cleaned out completely on these sizes.

During the period May 9-15 inclusive, the government approved for construction in this district 94 projects, valued at $2,923,402, and has denied 45 projects, valued at $1,361,404.

Seattle—Fabricators are temporarily



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handicapped by a strike of the metal crafts which is not expected to be of extended duration. Plants report many small projects placed. Larger commitments are confined to the supply of steel which is far below requirements and no improvement is expected soon.

Reinforcing Bars. . .

Reinforcing Bar Prices, Page 146

Pittsburgh — Reinforcing bar producers here continued to quote prices on basis of those in effect at time of shipment, on fabricated work as well as on mill lengths. However, some independent fabricators are quoting firm prices on fabricated work. Overall requirements for concrete bars remain well above current production schedules, although sellers state a number of jobs continue to be indefinitely postponed due to high construction costs and extended mill deliveries.

Chicago — Inquiries and awards of reinforcing steel are at low ebb. Holding short inventories, suppliers do not seek new business but rather try to avoid new commitments. Bulk of activity consists of projects involving considerably less than 100 tons. High cost of construction is having a pronounced effect in postponing new work.

Seattle—Reinforcing bars are being turned out in steady tonnages, mills operating at full capacity. The mills are handling their share of export business but tonnage figures are not available. The ratio of reinforcing bar to merchant bar production is gaining. New business consists mainly of small lots of less than 100 tons. Backlogs are being reduced. One plant is temporarily refusing large jobs, preferring to clean up old business. Many new projects are set for the immediate future but in some instances construction has been deferred due to high costs.

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Bolts, Nuts. . .

Bolt, Nut, Rivet Prices, Page 147

Pittsburgh — Sellers note a definite leveling off in new orders, with result output is exceeding new business for the first time in months. Unbalanced inventories in respect to various size ranges and in relation to other components have forced most consumers to adopt a more cautious buying policy. Improved mill deliveries have made it possible for fastener producers to gradually step up production schedules. Cold-heading stock continues to be in shortest supply, with deliveries extended up to one year in smaller size ranges. No revision in prices has been made recently, but sellers believe some advances may be necessary as result of recent wage increases.

Cleveland — Although a smaller producer of fasteners in the area reports satisfactory steel supply, the larger interests unanimously say steel receipts are far short of requirements in the smaller sizes. Some look for a worsening in the situation during the summer with some relief after that. Recent revision of wire rod extras by a leading steel producer resulted in a slight decrease in steel costs, one fastener maker reported, but this saving was more than offset by increased labor costs.

Rails, Cars . . .

Track Material Prices, Page 147

Pittsburgh — Freight car construction continues to lag behind projected assembly schedules. Car builders contend there is no point in stepping up production schedules until adequate supply of steel and components are on hand to assure uninterrupted operations. Carnegie-Illinois Steel Corp. is no longer accepting orders for 20-pound rails and will discontinue output as soon as present orders are filled. The corporation will continue to produce rails 25 pounds and heavier. Some months ago, Carnegie discontinued output of all light rails at Chicago.

Steel Allocations To Be Cut for Housing Program

Representatives of the steel industry have agreed voluntarily to allocate 261,000 tons of steel in the third quarter of 1947 for those housing items which the Office of the Housing Expediter considers critical. That amount of steel will be shipped to producers of plumbing and heating, builders, hardware, wiring devices, window sash and frames, and other critically needed housing items, as well as industrially-made houses, panels and sections. Certified for housing under the direct allocation system in the first quarter was a total of 295,000 tons. The voluntary allocation in the current quarter was 297,000.

Large Tonnages of Pig Iron Channeled Into Housing

Lone Star Steel Co., Sheffield Steel Corp., and Koppers Co. Inc. have agreed to produce large tonnages of pig iron needed for housing-type items in conjunction with their leasing surplus blast furnaces from the government.

The Lone Star company, which has leased facilities at Daingerfield, Tex., has agreed to supply for the housing program the full output of its blast furnace from the time it starts operations through September and at least two-thirds of its output for the remainder of 1947. Its production of foundry and malleable grades of pig iron is expected to rise from 12,000 gross tons in the first month of operation to 36,000 in the fourth month.

Lone Star has agreed also to honor requests by the housing expediter for shipment of foundry and malleable grades of pig iron to producers of housing-type items to the total amount of tonnage set forth in the agreement. If neither the company nor the housing expediter can obtain orders sufficient to absorb that agreed-on tonnage, Lone Star can dispose of the unsold balance in any way it chooses, provided the company gives the housing expediter 15 days' notice.

Sheffield, which has leased facilities at Houston, Tex., will devote one-third of its total metal output of that furnace to foundry pig iron from the time it starts operations through June 30. Its estimate of total output in this period is 13,500 gross tons per month.

From July 1 through Dec. 31, Sheffield will produce, in the Houston furnace, 4500 gross tons of foundry grade pig iron per month, and throughout 1947 the company will honor requests by the housing expediter for shipments of such iron to producers of housing items up to the tonnage specified. However, if the company or the housing expediter is unable to obtain orders totaling 4500 tons in any month, the total obtained shall become the maximum tonnage of such iron which Sheffield is obligated to produce in any succeeding month.

The 15 days' notice by the company to the housing expediter on disposal of unordered amounts of foundry grade pig iron is provided for in the Sheffield agreement.

Koppers Co. Inc., renewing a lease on a blast furnace at Granite City, Ill., which it has been operating, agrees that from June 1 through Dec. 31, its minimum output of foundry and malleable grades of pig iron shall be approximately 37½ per cent of its total metal output, that total normally being about 30,000 gross tons per month. The company further agrees to ship about 30 per cent of its output of foundry and malleable grades to producers of housing items.

Pig Iron. . .

Pig Iron Prices, Page 148

Pittsburgh—Pig iron shortage in this district is said to be greater than at any time since termination of the war. Interruptions to foundry operations in the past due to strikes, plus fact production schedules of some interests involved in the directive housing program did not increase as originally planned, made it possible for the lone merchant producer here to meet essential requirements of the bulk of jobbing foundries during 1946. However, since the first of the year there hasn't been any major interference with foundry operations, with exception of minor interruptions resulting from industrial gas shortage. As a result, pig iron inventories of most foundries are low. Some interests have been forced to curtail operations to about 50 per cent of capacity, while most are able to sustain production schedules between 80 and 90 per cent. General pig iron shortage has been aggravated by scarcity of good grades of cast scrap, plus fact prices for these items are still unusually high. Foundry coke supply also is tight, but doesn't represent such a pressing problem as pig iron. Carnegie-Illinois Steel Corp. blew in the No. 6 blast furnace at its Duquesne Works last week, making a total of 43 out of 47 units in this district now pouring iron.

Boston—Although consumers in most instances are better supplied with pig iron on a short term basis, they have been unable to replenish stocks. The volume from the Mystic furnace is more or less fixed in tonnage and distribution. As a result, most melters have been un-

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able to increase the ratio of iron in melts. Foundries are anxious to increase the volume of iron in melts at current price levels, but until a larger tonnage is available from Buffalo and other outside producers, this is doubtful.

Philadelphia — While falling short of consumer requirements, pig iron supply is increasing and there is a little less pressure than heretofore. This is especially true of some gray iron foundries, which are still having difficulty getting an adequate supply of coke and which are finding some falling off in their orders. However, with regard to coke, actual experiences in obtaining adequate supplies are not quite as bad as originally expected at the time the leading district producer of by-product foundry coke was forced to drastically curtail sales because of a major repair program which will likely be continued for some months. This is because beehive coke producers in western Pennsylvania and West Virginia have been able to supply a little more tonnage than anticipated.

New York—Pig iron is moving a little more freely into the district, but supply is still short of requirements at most foundries. In certain cases foundry coke supply rather than pig iron is the bottleneck. The coke situation is improving, as a result of a better movement of beehive coke into the East; nevertheless, the fuel situation is still tight. All in all, and notwithstanding these handicaps, it would appear that the foundry melt in the district is being at least sustained, a fact ascribed in part to a better supply of cast scrap.

Chicago — Evidences are appearing that demand for gray iron castings is easing somewhat, but this has not yet relieved pressure for pig iron. Suppliers report demand for iron exceeds ability to supply and careful allocation of shipments is required. At least three foundries in this district are down because of failure of operators and unions to negotiate new contracts providing wage increases comparable to those granted in the basic steel industry. Inland Steel Co. has restored all but one of the blast furnaces banked during the recent strike at its plant, to give a total of 38 district furnaces active.

Buffalo—District pig iron production slipped six points to 87 per cent of capacity as the Bethlehem Steel Lackawanna plant shut down a furnace for relining. The furnace, which was on basic iron, will be down for two to three months. While order cancellations add to bookkeeping tasks, merchant pig iron producers report current output is still far short of demand. Producers are more concerned with the poor quality of coke which is cutting into furnace operations. Poor charging mixtures are reported in many instances because coal is averaging higher percentages of ash and sulphur.

Cincinnati — Allotments of pig iron continue inadequate to meet the demand despite a heavy proportion of scrap in the melt. All foundries are taking whatever tonnage available, although some report castings orders have slowed.

St. Louis—Pig iron production at Koppers Co. Inc., principal supplier of this district, remains at 50 per cent of capacity. One of two blast furnaces has been down two months for relining and repairs, creating a severe shortage. Little iron comes here from outside points. Second furnace is to resume operations in two weeks. Outside shippers generally have been unable to meet appeals from melters here for increased quotas. Partial shutdown of Koppers' principal hot metal consumer has helped alleviate what otherwise would have been a critical scarcity.

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Iron Ore. . .

Iron Ore Prices, Page 148

Consumption of Lake Superior iron ore by furnaces in the United States and Canada declined 400,581 tons in April to 6,578,623 tons compared with 6,979,204 tons in March, but showed an increase of 1,809,905 tons over the April, 1946, total, according to the Lake Superior Iron Ore Association, Cleveland. Total for the first four months of this year was 26,845,967 tons (25,887,280 in United States and 958,687 in Canada) compared with only 16,257,163 in the like 1946 period (15,507,154 tons in the United States and 750,009 in Canada).

As of May 1, 171 furnaces were in blast compared with 174 as of Apr. 1 and only 114 as of May 1, 1946. There were 20 furnaces idle in the United States and 2 in Canada as of May 1 compared with 16 and 3, respectively, as of Apr. 1.

Total stocks on hand declined to 18,554,803 tons as of May 1 compared with 17,411,010 a month earlier and 23,078,989 at the same time a year ago. Of the May 1 total, 1,816,400 tons were on Lake Erie docks in the United States and 11,738,403 tons at furnaces, of which 11,277,139 tons were in the United States and 461,264 in Canada.

Scrap. . .

Scrap Prices, Page 152

Philadelphia — Scrap prices here have turned decidedly firm, with no changes in the steel grades and for the first time in several weeks no change in the cast grades. Meanwhile, the flow of scrap has decreased considerably compared with a month or so ago. With prices off substantially from the peak of a few weeks ago, the incentive to collect scrap has been reduced. Whether the market has actually struck bottom on the present price movement remains to be seen, but the consensus of leading trade interests is that it has or just about done so. Any further substantial recession in prices, under present conditions of high consumption, would dry up supply in short order, it is believed.

Steel scrap buying at present involves relatively small quantities. Some trade leaders believe that the placing of large orders could be done only at higher prices and there is question as to how long present small buying can continue at existing levels.

On the other hand, consumers of steel scrap have been able to build up inventories to some extent and, therefore, are not in as desperate need for tonnage as they were a few weeks ago. Consequently, they can afford to coast along to some extent.

New York — Scrap prices generally appear to have reached bottom in the present movement, according to leading brokers here. Malleable is the only grade that is down from a week ago, brokers now paying $46 to $48, fob shipping point. On the other hand, short shovel turnings are slightly higher, now holding at $18.50 to $19, as compared with a flat $18.50 recently. Consumer buying continues modest, with few outstanding orders being reported.

Pittsburgh — Scrap shipments to major consumers continue in good volume, but little progress in augmenting inventories has been possible due to practical capacity steelmaking operations. Considerable tonnage continues to originate direct from customers. Although mills and foundries have become more selective in their ordering and exercise more rigid inspection of shipments, requirements for scrap are expected to remain heavy. Dealers' yards were cleared of scrap at the higher price levels, and the volume of scrap moving through these yards for processing has recorded a noticeable decline in recent weeks. Based on limited tonnage recently purchased, heavy melting steel scrap continues at the $30 level. However, some trade authorities predict slightly higher prices next time the mills again enter the market for substantial tonnages.

Boston—Prices for steel scrap are steadier and have not declined to the basis of $30, Pittsburgh, for heavy melting grades. The market here is still $23.25, fob shipping point. Buying of cast grades is dull, many consumers being out of the market, and prices are weaker. The market has reversed itself recently, price and buying wise, as between steel and cast grades. The former has steadied after a sharp downward reaction while cast has turned dull with prices declining. Consumers of both grades are more selective.

Cleveland — Undertone of the local scrap market is firm with No. 1 heavy melting holding at $30.50 to $31. New

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buying by mills is light since shipments are coming in well on old contracts. Receipts are about equal to the all-time high rate of consumption, indicating that mills will have to make new contracts by the end of this month in order to maintain present level of reserves. Consensus in the trade here is that there will be little change in prices when active buying is resumed.

Buffalo—Barring a further dip in bids for cupola cast, the scrap market warily marked time last week pending the placement of new orders for steelmaking grades, probably at the end of the month. Dealers continued to ship against old orders. Most dealers have sufficient unfilled tonnage on their books to keep them busy for the balance of this month. Although the market has levelled off at the range of $29 to $31 for No. 2 heavy melting and bundles, dealers reported they were unable to book new orders at this time at the quoted range. Cupola scrap slipped to $35 to $38 a ton, a drop of $2 to $3.

The scrap market was bolstered by the withdrawal of a basic pig iron furnace at the Bethlehem Lackawanna plant.

Chicago — Although open-hearth scrap is holding steady at $29 a ton, delivered mill, the market has assumed a stronger undertone. Mills have reasonably good inventories and are continuing to receive good volume of material on old orders. New buying of scrap is light, being of a more or less hand-to-mouth character. Nevertheless, it is this which appears to be firming up the tone. Opinion is that since scrap is being produced in better volume the market is likely to hold for some time close to the present price level.

Cincinnati — Scrap prices held unchanged last week. Although the market level was not well established, undertone was firmer. There was confidence in some quarters that prices would retreat no further, perhaps gain, on a renewal of mill buying generally.

St. Louis—New scrap price declines were recorded here last week when four grades of cast scrap eased $1 to $2 and heavy melting steel grades, for the first time in months, showed a price differential. Previously melters had found melting steel so scarce that virtually anything sold as No. 1. No. 1 heavy melting remains at $29-$30 but No. 2 has slipped to $26.50-$27.50.

Seattle—Steel scrap continues to reach terminal points in increasing volume and mills anticipate no further shortage during the remainder of 1947.

Warehouse. . .

Warehouse Prices, Page 149

Cleveland — Hot-rolled sheet prices were revised last week by many of the area's leading warehouses. Affecting prices both upward and downward depending on gages, the revision will have little overall effect on prices. Changes vary from a reduction of 5 cents per hundred pounds for 16 gage to an advance of 15 cents for 7 gage, it was reported.

No improvement is noted in steel receipts from mills of the chronically short items, chiefly hot-rolled in the smaller sizes, although cold-finished products are generally more plentiful. Prospects for third quater appear dimmer with some mills planning allocation reductions to catch up on arrearages. One distributor, critical of his supplier's oversold position, reports return to him of an order which had been on the mill's books for 18 months. Delivery promises had been extended periodically until finally the mill reported discontinuation of that product's manufacture.

Pittsburgh — In a move to simplify method of pricing hot and cold-rolled sheets, at least one steel distributor has reverted to former practice of applying a uniform warehouse price spread to the mill base price plus extras. The new warehouse price mark-up is $1.30 on hot-rolled sheets and $1.40 on cold rolled. In recent months the warehouse prices for these products were set up on the principle of keeping a percentage profit spread, and were based on mill quotations plus a 45 per cent mark-up for hot-rolled sheets and 40 per cent on cold-rolled. The percentage mark-up of 33 1/3 per cent on galvanized sheets still remains in effect, for mill price of this item is subject to frequent revision having been tied in closely with that of zinc price quotations. Result of this revision in warehouse pricing procedure averages out to only a relatively minor net change through the various gage brackets. The former warehouse price for 10 gage hot-rolled sheets, for example, was $3.90 per 100 pounds for country delivery; under new procedure of adding $1.30 warehouse price spread to mill base of $2.50, plus 20-cent gage extra, the price is $4. However, for 16 gage hot-rolled sheet the new warehouse price is $4.30, in contrast to $4.35 per 100 pounds under former percentage mark-up pricing policy.

Chicago—Reflecting the leveling off in operations by various industries, steel warehouses are experiencing a lower volume of inquiries than has prevailed in the past. However, because of low inventories and slow mill receipts, they have more business than can be handled comfortably.

Cincinnati—Steel excepting alloys, is moving actively from warehouses to maintain a sales volume this month about on a level with April. Mill replacements are unimproved. Some jobbers indicate that customers are a bit more conservative, although the overall demand appears as great as ever.

Canada . . .

Toronto, Ont. — Iron and steel production in Canada continues to expand. While output for March was below the high rate for January, it showed a gain over the shorter month of February. Production of steel ingots and castings in March made a new high for the past two years For the month of March pig iron output held to a daily average of 5303 net tons which was 70.5 per cent of total capacity, which compares with daily output of 5379 tons in February, or 71.5 per cent, and with 4588 tons, or 61 per cent, in March, 1946.

Production of ferroalloys made a new high record for the year in March at 14,197 net tons and included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

Steel ingots and castings produced in March totaled 269,732 net tons, which was a daily average of 8701 tons or 89.5 per cent of rated capacity and compares with 84.2 per cent in February and 82.7 per cent in March, 1946. Output included 263,193 tons of steel ingots and 6539 tons of steel castings.

Fate of Labor Reform Legislation Uncertain

(*Concluded from Page* 60)

typewritten pages. Section on procedure of adjustment of grievances now takes up 14 pages in the agreement and provides detailed procedure based on the experience gained in past years. Job classifications and rates of pay section consumes another 14 pages of the contract. Other sections have been similarly expanded and clarified to minimize misunderstandings. They delineate the gains and security which labor has won in the past 14 years in the form of union security, overtime pay, liberal paid vacations, grievance procedure, classification of jobs and rates of pay, seniority, severance allowance, reporting or call-in allowances, safety and health conditions. Some contracts provide for insurance and other social security benefits paid for by the company.

The majority of these benefits will be retained by labor whether the labor reform bill is finally enacted or not by the legislature.

On the other hand, the abuses of power by the labor leaders, against which the legislation is aimed, are due for curtailment—by either the pending bill or by other action.

Rail Steel Bar Association Meeting Stresses Research

(*Continued from Page* 65)

increased and market price decreased. Steps were taken to assure improved grading and classification of rerolling rails with the thought the industry can afford to bid higher for raw material properly graded. During ensuing weeks, the association will concentrate on obtaining cooperation of the railroads, several of the larger ones already having promised full support.

Several speakers urged a more social attitude in dealing with employees. It was recommended that member companies affiliate with local groups of employers in labor discussions rather than blindly follow basic steel. This is regarded as important in the rail steel bar industry in that, generally speaking, the number of employees per firm is small, man-hours per ton of product are higher than in the basic steel industry, and plants are located in small communities.

F. G. Carrel, formerly general manager, Franklin Steel Works, Franklin, Pa., (now the Franklin Steel Division, Borg-Warner Corp.), Julian A. Pollak, president, Pollak Steel Co., Cincinnati, and W. W. Scott Jr., vice president and general manager of sales, Laclede Steel Co.,

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BEDFORD FOUNDRY & MACHINE CO.
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St. Louis, were elected to honorary membership in the association.

Two new directors of the association were elected as follows: Albert C. Weihl, vice president and general manager, Pollak Steel Co., Cincinnati; and George W. Armstrong Jr., president, Texas Steel Co., Ft. Worth, Tex.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, powerhouse addition, Unit No. 5, Public Service Co. of Northern Illinois, Joliet, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Sargent & Lundy, Chicago, engineers.

610 tons, store extension, Carson, Pirie, Scott & Co., Chicago, to New City Iron Works, Chicago.

400 tons, Pulaski grade school, Board of Education, Chicago, to Reuter Bros. Iron Works Inc., Chicago.

300 tons, chipper and barker buildings, Crown-Zellerbach Paper Co., Port Townsend, Wash., to Pacific Car & Foundry Co., Seattle.

300 tons, rotogravure plant, R. R. Donnelley-Crawfordsville Co. Inc., Chicago, to Duffin Iron Co., Chicago.

290 tons, construction at Lackawanna, N. Y., Research Corp., to the Standard Boiler Works, Lebanon, Pa.

240 tons, power plant, Litchfield, Minn., to St. Paul Foundry & Mfg. Co., St. Paul.

220 tons, factory building, Daniels Mfg. Co., Rhinelander, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

200 tons, building, Hendrickson Motor Truck Co., Lyons, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

195 tons, tramway, Interstate Equipment Co., Elizabeth, N. J., to Frank N. Weaver, Lansdale, Pa.

160 tons, city bridge over Cobbs Creek, Philadelphia, to American Bridge Co., Pittsburgh.

150 tons, boiler supports, Combustion Engineering Co. at Martinsville, Ind., to Ingalls Iron Works, Birmingham, Ala.

110 tons, bridge, contract 2727, Phlox, Ind., for State Highway Commission, to Central States Bridge & Structural Co., Indianapolis; Kahl & Mahan, contractors.

100 tons, approximately, Pennsylvania Railroad bridge approaches, New Brunswick, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

About 4000 tons structural steel and 650 tons truss steel, office building, General Petroleum Corp., to Consolidated Steel Corp. Ltd., both of Los Angeles, through P. J. Walker Co., general contractors.

STRUCTURAL STEEL PENDING

1360 tons, five highway bridges, Puyallup river, Tacoma, Wash., for U. S. engineer, Seattle; Manson Construction & Engineering Co., Seattle, low, $1,049,273.

1000 tons, addition, Heckman Biscuit Co., Grand Rapids, Mich.; Giffels & Vallet, Detroit, engineers; bids May 23.

390 tons, fine arts building, University of Illinois, Urbana, Ill.; Midland Structural Steel Co., Cicero, Ill., low; bids May 13.

300 tons, bus terminal, Chicago Surface Lines, Chicago; bids in.

164 tons, bridge Sec. 136F2, Alexander county, Illinois; bids taken May 2 rejected; new bids May 16, Illinois Steel Bridge Co., Jacksonville, Ill., low.

100 tons, beam span, Union Pacific Railroad, Omaha; bids May 12.

Unstated, fine arts building, University of Kentucky, Lexington, Ky.; bids May 29.

Unstated, material for Pasco pumping plant, Columbia basin; bids rejected by Bureau of Reclamation, Denver.

REINFORCING BARS . . .

REINFORCING BARS PLACED

150 tons, warehouse at 63 Bogart St., Brooklyn, N. Y., to Capitol Steel Co., New York, through Pioneer Engineering Co., general contractor.

150 tons, warehouse, 5207 Flushing Ave., Maspeth, Queens, N. Y., to Capitol Steel Co., New York, through Pioneer Engineering Co., New York.

125 tons, warehouse, Benner Tea Co., Burlington, Iowa, to Inland Steel Co., Chicago; Priester Construction Co., Davenport, Iowa, contractor.

100 tons, cold storage plant, Port of Olympia, Washington, to Bethlehem Pacific Coast Steel Co., Seattle; S. S. Mullen, Seattle, general contractor.

100 tons, cold storage plant, Peshastin, Wash., to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

750 tons, Addison St. sewer system, Department of Public Works, Chicago; bids May 28.

640 tons, Columbia basin projects; bids to Bureau of Reclamation, Denver, May 19.

100 tons, county bridge, Walla Walla, Wash.; J. H. Collins, general contractor.

100 tons plus, county bridge, Yakima, Wash.; Rumsey & Co., Seattle, low, $138,000, exceeds estimate.

Unstated, custodial school, to D. J. Malarkey, Portland, Oreg., $650,993; treatment hospital to L. H. Hoffman, Portland, $1,508,485; service tunnel, to Viesko & Post, Portland; awards by State Board of Control, Salem, Oreg.

Unstated, Columbia basin headquarters building, Ephrata, Wash.; Leise & Leighland, Seattle, low $759,301; bids rejected, estimated at $500,000; new call for bids to be issued.

PLATES . . .

PLATES PLACED

6000 tons, 150 propane tanks, Pacific Gas Corp., through New York offices, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, 2 propane tanks, Socony Vacuum Oil Corp., New York, through Hammond Iron Works, Hammond, Ind., to Chicago Bridge & Iron Works, Chicago.

PIPE . . .

STEEL PIPE PLACED

Two 72-inch plate-steel outlet pipes, each 530 feet long, for Horsetooth Dam, Bureau of Reclamation, to Thompson Pipe & Steel Co., Denver; delivery within six months.

STEEL PIPE PENDING

Unstated, 16,900 feet of 16-inch steel pipe and 1860 feet of 8-inch pipe for fire protection system, Bow Lake airport, Port of Seattle; general contract to Stateside Construction Co., Seattle, low $177,000.

Unstated, 30,000 feet of 3 and 4-inch steel pipe, pump houses and reservoir, for Skamania county P.U.D. No. 1; bids to George H. Ward, manager, Stevenson, Wash., June 13.

CAST IRON PIPE PENDING

Unstated, 37,200 feet of 2 to 16-inch iron pipe and fittings, for Coos Bay, Oreg.; bids to C. E. Carter, engineer, Portland, Oreg., May 22.

RAILS, CARS . . .

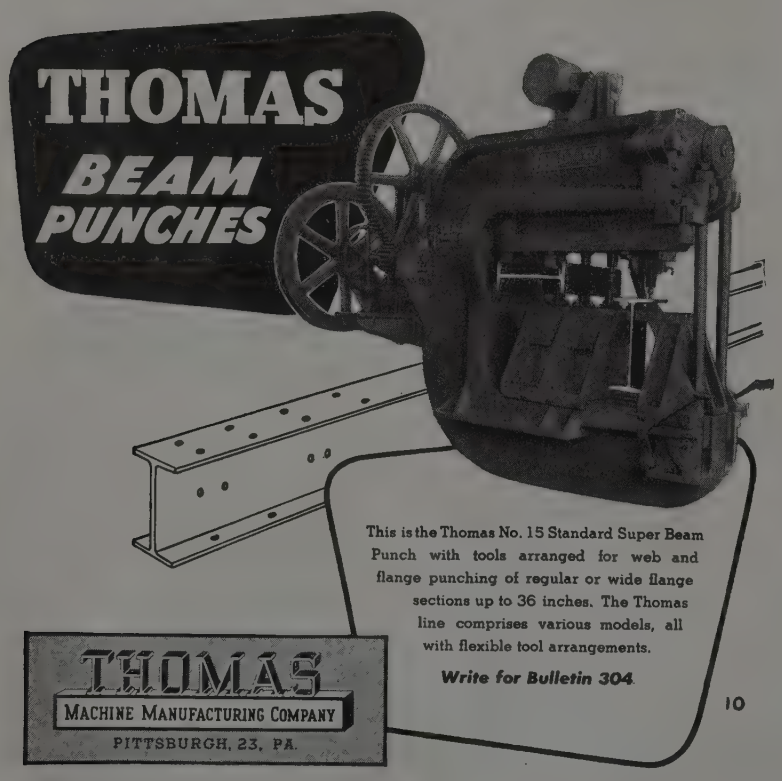
RAILROAD CARS PLACED

Northern Pacific Railway, 250 refrigerator cars, to Pacific Car & Foundry Co., Seattle.

Pacific Fruit Express, 1000 refrigerator cars, to Pacific Car & Foundry Co., Seattle.

LOCOMOTIVES PENDING

New York, New Haven & Hartford Railroad, 33 diesel switching locomotives; authorized by trustees; estimated cost, $13,850,000.



This is the Thomas No. 15 Standard Super Beam Punch with tools arranged for web and flange punching of regular or wide flange sections up to 36 inches. The Thomas line comprises various models, all with flexible tool arrangements.

Write for Bulletin 304

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MACHINE MANUFACTURING COMPANY
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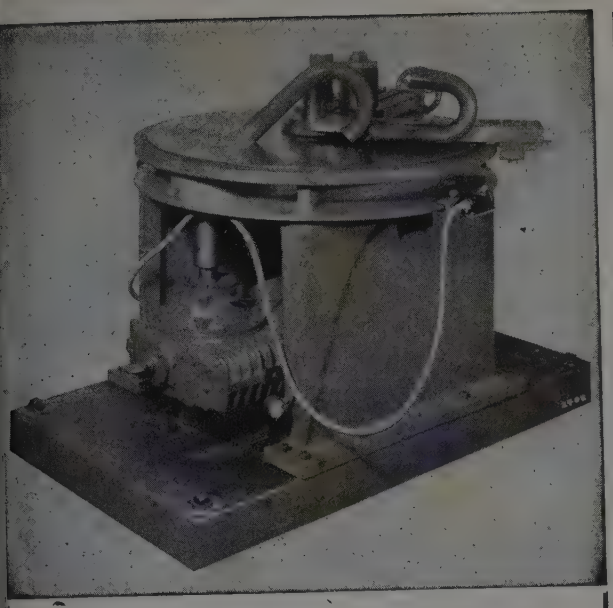

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This machine will bend 1" pipe at a cost less than 2c a bend including machine cost, direct labor and overhead. It has a production of about 300 bends per hour as long as all the bends are identical and in the same plane.

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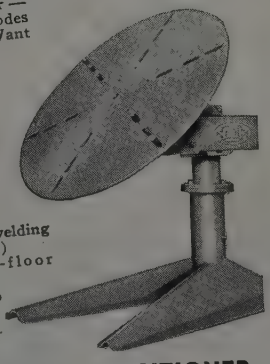

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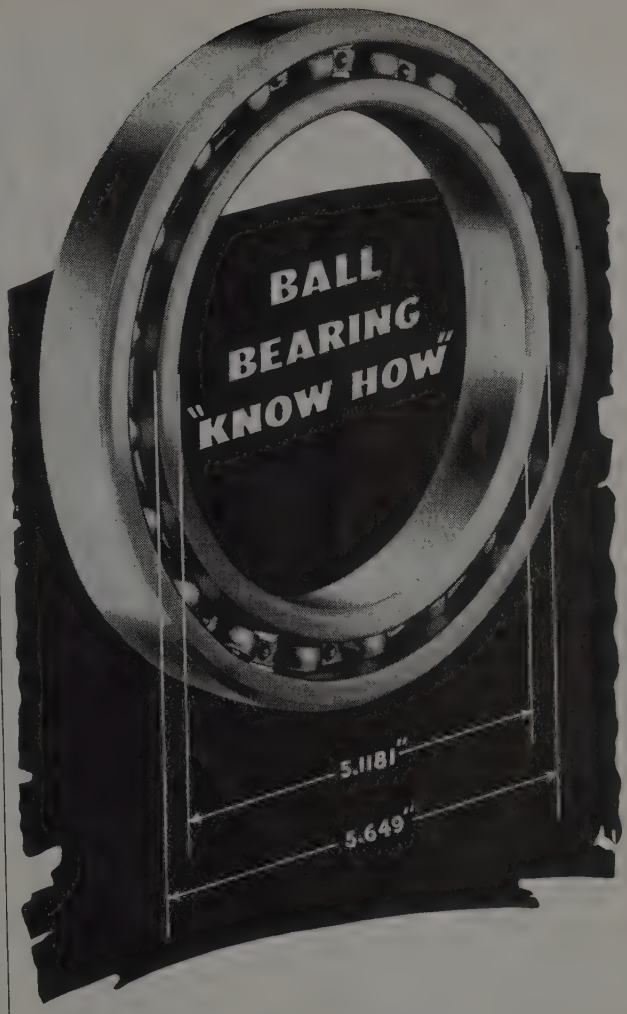

NOTE the exceptionally large diameter in relation to the race thickness of this radial ball bearing. It is not just an ordinary ball bearing —it's one that takes "ball bearing know how" to turn out to the exacting specifications of our customer. Tolerances allowed are close, for the piece of machinery into which this bearing goes is quality from end to end.

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

FRESNO, CALIF.—Southern California Edison Co., 601 W. 5th St., Los Angeles, has awarded a $200,000 contract to Johnson Western Co., 2100 Wilmington-San Pedro Rd., San Pedro, for a power house and appurtenances at a site about 55 miles east of here.

LOS ANGELES—Strutzel & Cioffi Inc. has been formed by John P. Strutzel and associates with a capital of $50,000 to manufacture and fabricate mechanical hydraulic equipment and parts. Firm is represented by G. N. Williams, 69 Spring St.

LOS ANGELES—Ahlcorp Inc. has been organized by Mark F. Jones, 622 Chapman Bldg., with a capital of $200,000 to manufacture metal products.

LOS ANGELES—T. F. Moorhouse Inc. has been incorporated by T. F. Moorhouse with capital of $200,000 as a steel and iron manufacturer, jobber and supplier. Firm is represented by J. Q. Gilchrist, 842 Title Insurance Bldg.

LOS ANGELES—Action Steel Co. has been formed by Dudley D. DeZonia and associates with a capital of $75,000. Firm is represented by Freeman & Moore, 5225 Wilshire Blvd.

ORANGE, CALIF.—Anaconda Wire & Cable Co. will build a $50,000 1-story factory, 90 x 182 ft in area, at 403 W. Maple St. Contract for steel work has been let to Star Mfg. Co., Oklahoma City, Okla. Structure was designed by L. L. Penn, 1011 S. Fremont Ave., Alhambra, Calif.

PITTSBURG, CALIF.—Dow Chemical Co., Industrial Rd., has awarded a $220,000 contract to Austin Co., 618 Grand Ave., Oakland, for an addition to its xanthrates ore plant.

SAN FRANCISCO—Specialty Spring Corp. has been organized with capital of $50,000 to manufacture springs, spring constructions and wire. With Thomas F. Winters as principal, the firm is represented by William C. Caubu, Humboldt Bank Bldg.

CONNECTICUT

CANAAN, CONN.—Electrocoil Co. of New York, 421 Canal St., New York, will build a 1-story factory here on High St. at a cost of $55,000. Architect is L. F. Caproni, 1221 Chapel St., New Haven.

ILLINOIS

MAYWOOD, ILL.—Public Service of Northern Illinois, 72 W. Adams St., Chicago, has awarded a $285,000 contract to Ragner Benson Inc., 4744 W. Rice St., Chicago, for a 100 x 260 ft shop addition.

IOWA

DES MOINES, IA.—Marquette Cement Mfg. Co., 140 S. Dearborn St., Chicago, will soon let a contract for a cement manufacturing plant which with equipment will cost over $60,000.

MICHIGAN

DEARBORN, MICH.—Michigan Forging Co., Detroit, has awarded a $105,000 contract for an addition to its factory here.

DETROIT—Scotten Mfg. Corp., 2485 Scotten, has been formed by William F. Wise with capital of $300,000 to manufacture and sell tools, dies and machinery.

DETROIT—Carlson Pattern Co., 6234 Second Blvd., has been formed by Leonard Carlson with capital of $50,000 to manufacture and sell production paterns, jigs and machinery.

DETROIT—Mellen Steel Fabricating Co., 1619 Dime Bldg., has been formed by Maurice Dreifuss with capital of $50,000 to buy, sell, fabricate and manufacture steel.

DETROIT—International Salt Co. Inc. is having architectural plans completed by Allen & Garcia, Chicago, for a $185,000 mill and storage building.

DETROIT—Nu-Way Tool Products Inc., 12190 Conant St., has been formed by Edward J. Smith with a capital of $150,000 as a screw machine production business.

FERNDALE, MICH.—Alrowa Metal Products Inc., 2400 Gainsboro, has been incorporated by Alfred J. Fisher Jr., with a capital of $200,000 to manufacture metals and metal products.

LANSING, MICH.—Atlas Drop Forge Co. has received CPA approval for a $98,000 factory addition.

OAK PARK, MICH.—Oak Park Screw Products Co., 21600 Wyoming, has been formed by Harold L. Evans with capital of $50,000 to manufacture and sell screw machine products.

PLYMOUTH, MICH. — Plymouth Enterprises Inc., 203 S. Main St., has been formed by Dennis O'Connor with capital of $50,000 to engage in a general manufacturing business.

WYANDOTTE, MICH.—All-Metal Products Co. has received CPA approval for a $50,000 alteration project.

NEW YORK

BUFFALO—Sterling Engine Co. has received a contract for eight diesel engines from U. S. Coast Guard.

SYRACUSE, N. Y.—Kilian Mfg. Corp. is building a 1200 sq ft addition to its plant. Company produces ball bearings and ball bearing casters.

OHIO

AKRON—Bearing Sales Inc. has been formed to manufacture and sell bearings and other steel products, by Leon Geschwind, 1534 Malasia.

ASHTABULA, O.—Electro Metallurgical Co., Lake Rd., has purchased two electrical furnaces from WAA. The company will spend $200,000 to convert the furnaces for production of ferrosilicon.

CLEVELAND—Klausner Cooperage Co., 5207 Grant Ave., plans to build a 1 story boiler and service room and an office addition which will cost $200,000. Engineers are Wilbur Waston & Associates, 4614 Prospect Ave.

CLEVELAND—Eaton Mfg. Co., 739 E. 140th St., has asked for bids on its $120,000 addition to its stamping plant. Engineer is George S. Rider Co., Terminal Tower.

CLEVELAND—Shirmer Dornbirer Pump Co., 1719 E. 39th St., will spend $55,000 for a 1 and 2-story addition to its factory.

COLUMBUS, O.—Van Bolt-Kreber Electrotype Co., 40 S. 3rd St., has awarded a $55,000 contract to Altman Coady Co., 3690 Sherwood Ave., for a 1-story factory.

HARRISON COUNTY, O.—Muskingum Coal Co., Zanesville, O., has purchased over 3000 acres in this county and will open a 600-ft slope mine soon.

LORAIN, O.—National Tube Co. has awarded a contract to Pennsylvania Engineering Co., New Castle, Pa., for four 25-ton bessemer converters, two 800-ton hot metal mixers, blast piping, transfer cars and auxiliary equipment. Cost will be over $1 million.

PAINESVILLE, O.—Coe Mfg. Co. plans to build a $205,000 factory addition.

SHELBY, O.—Ohio Seamless Tube Co. has launched a $100,000 project to buy and install standby fuel equipment.

TOLEDO, O.—Wright Industrial Supply Co. has been formed by John C. Wright, 2950 E. 132nd St., Cleveland, with a capital of $75,000 as a supply house for high speed and carbide cutting tools.

YOUNGSTOWN — McKay Machine Co. will build a $104,000 addition to its plant on W. Federal St. Firm will also purchase new equipment.

PENNSYLVANIA

CONSHOHOCKEN, PA.—Kimball Glass Co. has awarded a $55,000 contract to Frank J. Larkin Construction Co., 1518 Parrish St., Philadelphia, for an addition to its manufacturing building.

TEXAS

ABILENE, TEX.—Rock Island Refining Corp. of America, c/o L. B. Simmons, Duncan, Okla., plans to spend $90,000 on refinery plant improvements.

GOLDSMITH, TEX.—Shell Oil Co. Inc., Houston, plans to build compressor units costing $750,000.

HOUSTON, TEX.—Sheffield Steel Corp., Industrial Rd., has awarded a $275,000 contract to Mosher Steel Co., P.O. Box 279, to erect prefabricated steel buildings. Contract for building foundations goes to Tellepsen Construction Co., 3900 Clay St., at $90,000.

HOUSTON, TEX.—Diamond Alkali Co., Oliver Bldg., Pittsburgh, has awarded a $4 million contract to Brown & Root Inc., 4300 Calhoun Rd., for the design and construction of a chemical plant.

HOUSTON, TEX.—Sinclair Oil Corp. plans expansion of refinery which will cost over $20 million.

JACKSONVILLE, TEX.—Cherokee Mining Corp. plans to build a $500,000 steel blast furnace plant.

LONGVIEW, TEX.—Rogers Lacy has announced plans for a $3,750,000 project to include oil lines from Carthage, Tex., to Longview and Waskom to Jefferson and a gasoline plant.

ORANGE, TEX.—Kemso Chemical Co. Inc., M & M Bldg., Houston, is asking for bids on a proposed $90,000 chemical plant here.

SAN ANTONIO, TEX.—International Harvester Co., 1400 S. Flores St., is asking for bids on a project to remodel, repair and expand implement storage and assembly plant.

TEXAS CITY, TEX.—Monsanto Chemical Co. has let a contract to W. S. Bellows Construction Co., 716 N. Everton St., Houston, for temporary facilities in connection with $20 million reconstruction of chemical plant.

TYLER, TEX.—Tyler Heating Co. proposes to build a $100,000 manufacturing plant for gas heaters.

CANADA

CHATHAM, ONT.—Cunningham Sheet Metal Works, 1478 Kildare Rd., is considering plans for a plant addition here to cost about $40,000.

FT. ERIE, ONT.—Horton Steel Works Ltd. will build a machine shop and office buildings to cost about $1 million. Steel contract has been let to Standard Steel Construction Co., Port Robinson.

HAMILTON, ONT.—Stanley Works of Canada Ltd., Gerrard St., manufacturer of hardware, has awarded a $65,000 contract to Tope Construction Co. Ltd., 677 Main St. W., for construction of a plant addition. Architects are Prack & Prack, 36 James St. S.

THESSALON, ONT.—Hydro-Electric Power Commission of Ontario, 620 University Ave., Toronto, is preparing plans for construction of a power development project near here, on the Mississisauga river, estimated to cost $19 million.

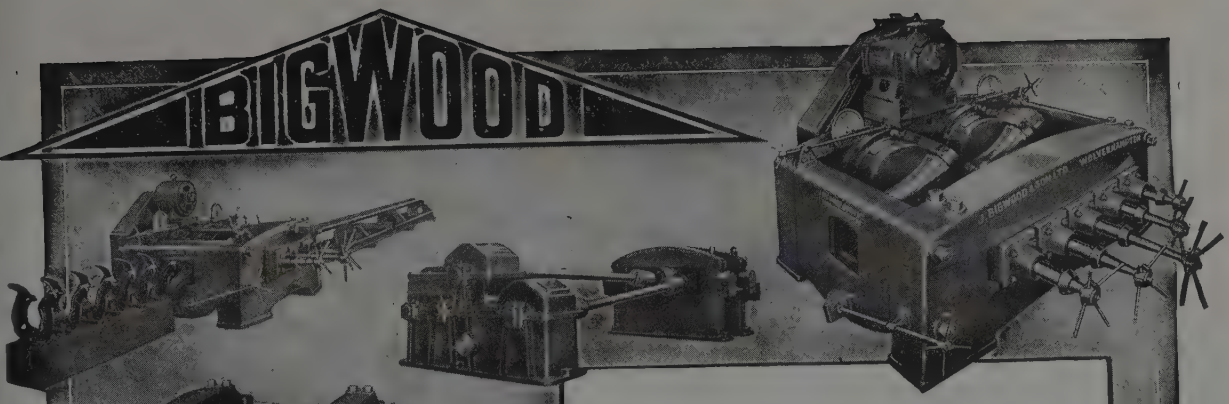
TORONTO, ONT.—Empire Spring Service, 872 Dupon St., is having plans revised by J. H. W. Bradfield, architect, 12 Adelaide St. E., for construction of a plant on Davenport Rd., estimated to cost $50,000.

WATERLOO, ONT.—Ontario Die Co., King St. S., is having plans prepared by Jenkins & Wright, architects, 49 King St. E., Kitchener, for construction of plant on Moore and David Sts., estimated to cost $50,000.

YORK TOWNSHIP, ONT.—Englishtown Cutlery of Canada, 93 Spadina Ave., is receiving bids through J. A. Thatcher, architect, 37 Cowan Ave., for construction of plant and office building, to cost about $100,000.

ST. LAURENT, QUE.—Aviation Products Co., 1410 Stanley St., Montreal, has asked for bids through Reuben Fisher, architect, 3476 Park Ave., for construction of plant on Kings Park Rd. to cost about $60,000.

BIGWOOD



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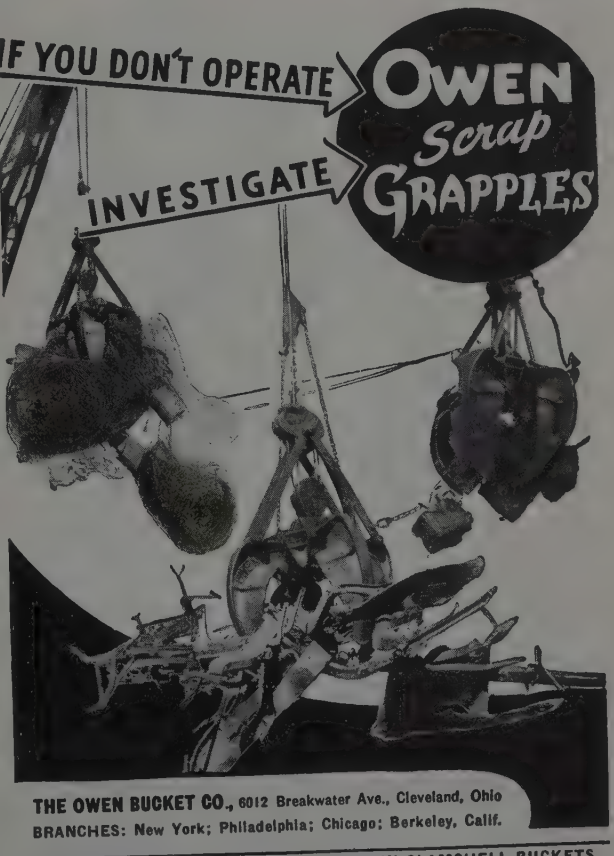

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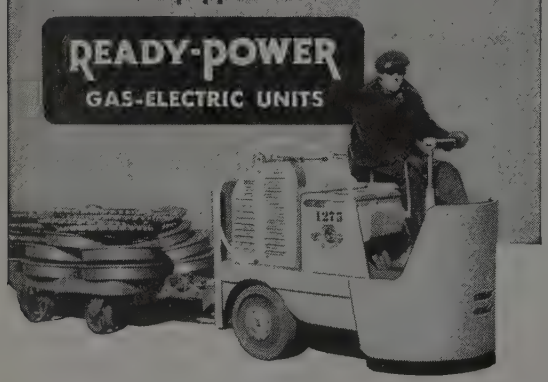

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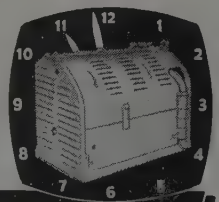

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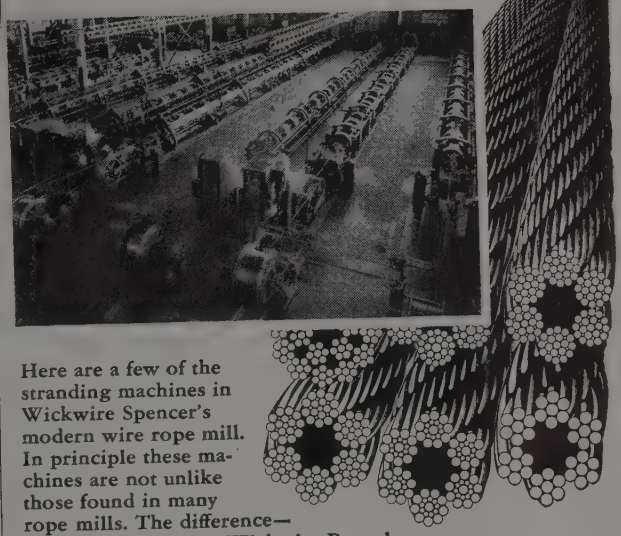

Here are a few of the stranding machines in Wickwire Spencer's modern wire rope mill. In principle these machines are not unlike those found in many rope mills. The difference—the thing that makes Wickwire Rope longer lasting—lies in the making of the steel and drawing of the wire used in the rope.

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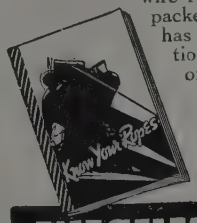

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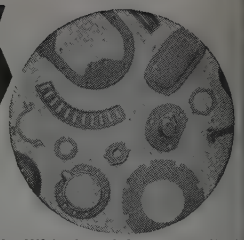

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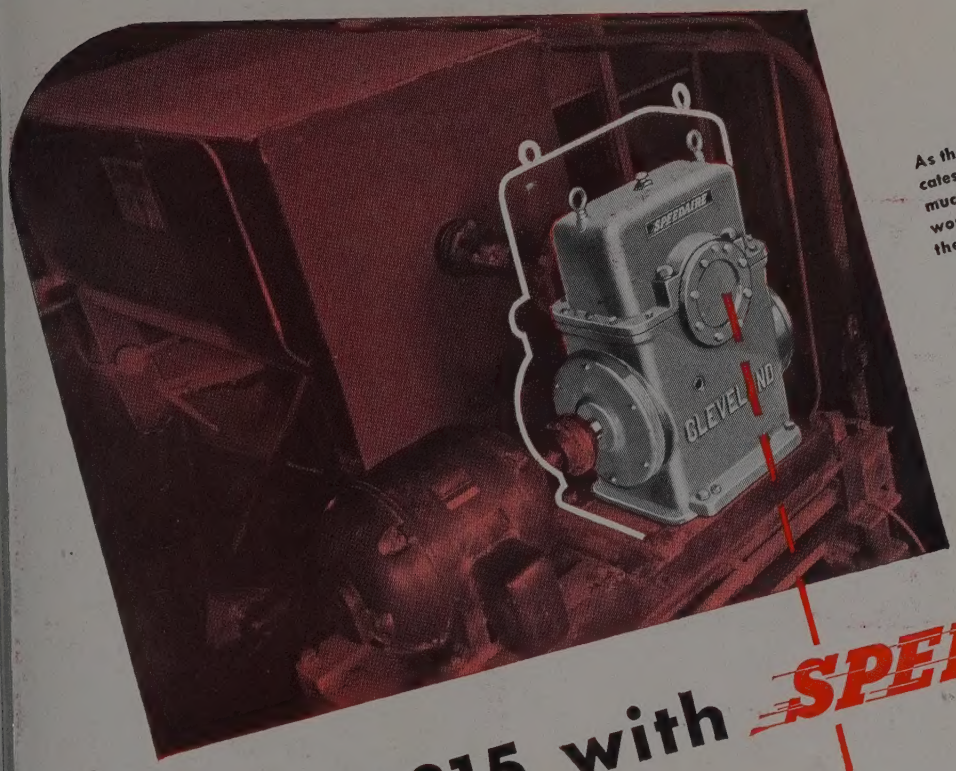

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In answer to the motor control problems of general industry, C-H engineers, the recognized control specialists, have consistently created standardized equipment of acknowledged superiority.

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The many exclusive engineering features of even the smallest units of Cutler-Hammer general purpose motor control and the performance records this equipment has established fully confirm its pedigree.

Industry's needs in motor control equipment are as varied as the duties electric motors are called upon to perform. In some instances, scores of motors are interrelated in a highly complex, specially engineered project in which the motor control becomes the very brain of a giant production unit. In other instances, the motor functions are relatively simple and the control can be provided by standardized general purpose motor control available from the stocks of hundreds of conveniently located electrical wholesalers. In this field of widely varying requirements, however, one feature of motor control *must* remain absolutely fixed. That feature is *dependable* performance. No motor can be so small or its use so casual that reliable operation is unimportant. To this end Cutler-Hammer engineering has long recognized but one standard of excellence . . . the closest approach to faultless performance that ingenuity and conscientious craftsmanship can provide. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

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